NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

INTEGRATING MONETARY AND NON-MONETARY RETENTION INCENTIVES FOR THE U.S. NAVY DENTAL CORPS OFFICERS UTILIZING THE COMBINATORIAL RETENTION AUCTION MECHANISM (CRAM)

by

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March 2010

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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** March 2010	**3. REPORT TYPE AND DATES COVERED** Master's Thesis	
4. TITLE AND SUBTITLE Integrating Monetary and Non-Monetary Retention Incentives for the U.S. Navy Dental Corps Officers Utilizing the Combinatorial Retention Auction Mechanism (CRAM)		**5. FUNDING NUMBERS**	
6. AUTHOR(S) Neil D. Cascardo, Sandeep Kumar			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000		**8. PERFORMING ORGANIZATION REPORT NUMBER**	
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A		**10. SPONSORING/MONITORING AGENCY REPORT NUMBER**	
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB Protocol number NPS.2010.0021-IR-EP7-A.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited		**12b. DISTRIBUTION CODE**	

13. ABSTRACT (maximum 200 words)

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This research used the Universal Incentive Package (UIP) auction and Combinatorial Retention Auction Mechanism (CRAM) to identify the cost savings opportunities for the Navy, while retaining the optimal number of Dental Corps officers. Additionally, this research summarized the importance of creating a balance between monetary and non-monetary incentives.

The Oracle Crystal Ball Monte Carlo simulation indicated that CRAM outperformed monetary only and universal auction mechanisms with an average savings between 24 and 30 percent. This research concluded that 61 percent retention level could be achieved by offering CRAM with an average savings of 24 percent over monetary only and UIP. The research concludes that CRAM provides an opportunity to individualize benefits that are not only valued by Dental Corps officers, but are also cost effective for the Navy.

For the Navy to achieve its retention goals and becoming a top-50 employer, it is imperative to create a balance between monetary and non-monetary incentives. This not only enhances morale but also overcomes work-related challenges.

14. SUBJECT TERMS CRAM, Dental Corps, Extrinsic, Incentive, Intrinsic, Monetary, Motivation, Navy, Non-monetary, Retention			**15. NUMBER OF PAGES** 163
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 8-98)
Prescribed by ANSI Std. Z39.18

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MASTER OF SCIENCE IN MANAGEMENT

from the

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LIST OF ACRONYMS AND ABBREVIATIONS

ACP	Advanced Clinical Practice
AEGD	Advanced Education in General Dentistry
ASP	Additional Special Pay
BCA	Body Composition Assessment
BCP	Board Certified Pay
BUMED	Bureau of Medicine and Surgery
BUPERS	Bureau of Naval Personnel
CNP	Chief of Naval Personnel
CONUS	Continental United States
CRAM	Combinatorial Retention Auction Mechanism
CRTS	Casualty Receiving and Treatment Ship
CSRB	Critical Skills Retention Bonus
DC	Dental Corps
DCCM	Dental Corps Community Manager
DCPRB	Dental Corps Professional Review Board
DoD	Department of Defense
DOMRB	Dental Officer Multi-Year Retention Bonus
DoN	Department of the Navy
DOPMA	Defense Officer Personnel Management Act
FAP	Financial Assistance Program
FMF	Fleet Marine Force
FY	Fiscal Year
GPA	Grade Point Average
GPR	General Practice Residency
GSA	Global Support Assignment
HPLRP	Health Professions Loan Repayment Program
HS	Homesteading
HPSP	Health Professions Scholarship Program
HSCP	Health Services Collegiate Program
IA	Individual Augment
IRB	Institutional Review Board
ISP	Incentive Special Pay
IST	Interservice Transfer
LOCS	Length of Commissioned Service

MC	Medical Corps
MI	Monetary Incentives
MLG	Marine Logistics Group
MSC	Medical Service Corps
NADDS	Navy Active Duty Delay for Specialists
NDCNMIRS	Naval Dental Corps Non-Monetary Incentives Retention Survey
NDR	National Institute of Dental Research
NMI	Non-Monetary Incentives
NPC	Navy Personnel Command
NPRST	Navy Personnel Research, Studies, and Technology
NPS	Naval Postgraduate School
OCO	Overseas Contingency Operations
OCONUS	Outside the Continental United States
PCS	Permanent Change of Station
PG	Post-Graduate Training
PGY	Post-Graduate Year
PT	Platform Type
SABB	Sabbatical
SECNAV	Secretary of the Navy
TIG	Time in Grade
UIP	Universal Incentive Package
USU	Uniformed Services University of the Health Sciences
VP(AP)	Varying Percentile (All Positive)
VSP	Variable Special Pay
WDU	Weekly Dental Update
WEP	Work Engagement Profile

ACKNOWLEDGMENTS

First and foremost, we would like to thank God, for providing us with the strength, wisdom, and perseverance to complete this thesis, and the Manpower Systems Analysis program itself.

We would like to thank our advisors: Dr. William Gates for his unparalleled support and advice since the beginning of first quarter in reference to our thesis and professional application, and Dr. Peter Coughlan for his advice throughout this thesis. Additionally, we would like to thank Ms. Mary Lou Vossen and Ms. Yolanda Melendez for keeping up with our incessant requests for appointments with our advisors.

Special thanks to CDR Brendan Melody, MSC, for his continued support and guidance throughout the process. CDR Melody was instrumental in providing clear direction and his expertise in all matters pertaining to Dental Corps.

We would like to thank Professors Carol Stoker, Alice Crawford, William Hatch, Mark Eitelberg, Stephen Mehay, and Gail Thomas for their direction.

Many thanks go to Dr. Angela O'Dea and Ms. Rikki Panis at the Institutional Review Board office for going above and beyond in ensuring timely submission and approval of our survey.

Finally yet importantly, we would like to thank our families for their selfless support, unconditional love, and unwavering encouragement throughout our naval careers, especially over the past twenty-one months.

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I. INTRODUCTION AND BACKGROUND

A. INTRODUCTION

It is imperative to recognize, analyze, and find solutions to the challenges that organizations encounter to sustain stability for successful mission accomplishment. The most difficult challenges that organizations encounter in today's competitive environment include recruitment and retention of talented individuals. The U.S. military is vulnerable to recruiting and retention challenges, especially in the critical skills that are lucrative in the civilian sector, such as dental professionals, because of the nature of the profession. The dental profession includes individuals who are highly respected, skilled, educated, and compensated, which makes it difficult to retain and recruit these individuals, especially in the military. The Medical Department of the Navy, which encompasses the Medical Corps, the Dental Corps, the Medical Service Corps, the Nurse Corps, and the Hospital Corps, faces these challenges at a high rate because of its operational nature, growing Overseas Contingency Operations (OCO), and highly rewarding benefits in the civilian sector.

B. PURPOSE OF THIS RESEARCH

This research focuses on the naval officers serving in the Dental Corps (DC), which is experiencing retention challenges despite the downturn in the U.S. economy. The major difficulties involve the senior Lieutenant and Lieutenant Commander ranks, and specific specialties, such as oral maxillofacial surgery, prosthodontics, endodontics, and general dentistry. These officers tend to leave after initial residency obligations. The DC is concerned with, and closely monitoring, oral surgery manning, which is forecasted to drop below 80 percent in fiscal year (FY) 2010. Recalls of senior oral surgeons to bridge the gap are being considered, and the General Dentist Critical Skills Retention Bonus renewal is pending approval at Under Secretary of Defense for Personnel and Readiness. Table 1 shows the five-year continuation rate for junior dentists over the past 10 years (B. Melody, personal communication, February 16, 2010).

Table 1. 5-Year Retention by Year Entering Active Duty (From: Dental Corps Special Pay Plan, 2010, B. Melody, personal communication, February 16, 2010)

1996	1997	1998	1999	2000	2001	2002	2003	2004
45%	64%	50%	51%	28%	32%	25%	37%	29%

Figure 1 (B. Melody, personal communication, February 16, 2010) reflects the most recent five years. The DC lost from 63–72 percent of each officer cohort by the fifth year of commissioned service. The main concern is the five- to eight-year time frame, which is indicated as the Length of Commissioned Service (LOCS) in Figure 1. The most important element of this thesis is to focus on this issue and identify means to overcome the retention challenge, especially in the critical specialties.

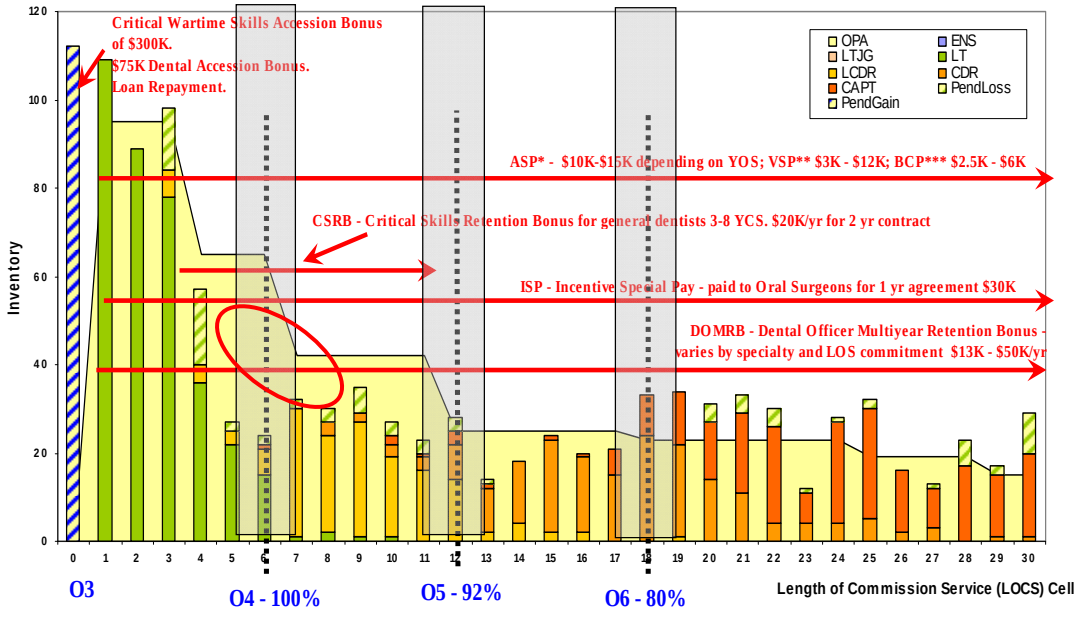

Figure 1. Dental Corps Length of Service Chart (From: Community Manager Brief, 2010, B. Melody, personal communication, February 16, 2010)

Previous research has shown that monetary incentives (MI) are not the only reason service members leave the Navy. Non-monetary concerns play a significant role in service members' decisions to leave the Navy. The primary purpose of this research is to determine if the Combinatorial Retention Auction Mechanism (CRAM), offering a

portfolio of monetary and non-monetary incentives (NMI), can provide a more cost-effective means to influence retention behavior of DC officers than offering monetary incentives only. Furthermore, this research identifies the cost savings generated by incorporating the non-monetary incentives in addition to the monetary incentives valued by DC officers.

C. RESEARCH QUESTIONS

This research addresses the following primary and secondary questions.

1. Primary Question

Can a CRAM offering a portfolio of non-monetary and monetary incentives provide a more cost-effective means to influence retention behavior than offering monetary incentives alone?

2. Secondary Questions

- What mix of monetary/non-monetary incentives would be both valued by sailors and cost-effective for the Navy?
- What operational auction design would allow the Navy to tailor monetary/non-monetary retention incentive packages to individual sailors while simultaneously economizing on Navy resources?
- What cost savings might the Navy expect by moving from purely monetary incentives to a portfolio of monetary/non-monetary incentives, if both retention incentive programs are optimally designed?
- How would population representation be affected by these retention incentive packages?

D. BACKGROUND OF THE NAVY DENTAL CORPS

"The Navy Dental Corps was established by provisions of an act of 22 August 1912 (now codified by act approved 10 August 1956, 10 U.S.C. 6027)" (Manual of the Medical Department, 2008, p. 6-3). Captain Andrew D. Peters, a Dental Corps officer, reported on the formative years of the Dental Corps (Navy Medicine, 2007, p. 24).

- The idea of a distinct Navy Dental Corps had been swirling around the Navy medical community as far back as the 1870s. In the 1870 annual report to the Secretary of the Navy, the Chief of the Bureau of Medicine, William Wood, praised the importance of "dental science" and recommended the hiring of permanent, trained dental officers. To some extent, Congress took heed and a dental service was established at the medical department of the U.S. Naval Academy in 1873.
- The Secretary of the Navy was authorized to appoint no more than 30 acting "assistant dental surgeons." In October 1912, Emory Bryant and William Cogan became the first two dental officers to enter active duty.
- In World War I, the Dental Corps grew from 35 to 500 active duty dental officers. Most were assigned to ships or overseas activities.
- Early in 1923, two significant milestones occurred.
    - The establishment of the U.S. Naval Dental School
    - The creation of a dental division in the Bureau of Medicine and Surgery

1. Mission

The primary mission of the Navy DC is "to provide care for active duty Navy and Marine Corps personnel that will prevent or remedy diseases, disabilities, and injuries of the teeth, jaws, and related structures, which may directly or indirectly interfere with the performance of military duties" (Manual of the Medical Department, 2008, p. 6–3).

2. Vision

The Navy Dental Corps vision is to promote, protect, and restore the dental health for those entrusted to its care (Manual of the Medical Department, 2008, p. 6–3).

3. Organization

The Navy Dental Corps Chief's office is located at Bureau of Medicine and Surgery (BUMED) in Washington, DC. According to the Manual of the Medical Department (2008, p. 6–5), the mission and functions of the Navy Dental Corps are as follows and are consistent with Title 10, Subtitle C, Part I, Chapter 513, and section 5138.

- Establish professional standards and positions for dental practice.
- Initiate and recommend action pertaining to complements, appointments, advancement, training assignments, and transfer of dental personnel.
- Serve as the advisory agency for the BUMED on all matters relating directly to dentistry.

4. Grades and Strength

The Navy Dental Corps consists of officers in the following grades.

- Lieutenant
- Lieutenant Commander
- Commander
- Captain
- Rear Admiral (lower half) (Manual of the Medical Department, 2008, p. 6-7)

"The Secretary of the Navy (SECNAV) prescribes the authorized strength and grade levels of the active duty Dental Corps officers based on the overall needs of the Navy and Marine Corps" (SECNAVINST 1420.1B, 2006).

5. Collar Device

The Navy Dental Corps device consists of a gold spread oak leaf, with a silver acorn on each side of the stem.

Figure 2. Dental Corps Collar Device (From: U.S. Navy Uniforms)

6. Appointments and Qualifications

"Appointments in the Dental Corps of the U.S. Navy and the Naval Reserve are made as vacancies occur or as otherwise determined by the Chief of Naval Personnel" (OPNAVINST 1120.5A, 2009).

According to the Manual of the Medical Department, the regular Navy appointments in the Dental Corps require following qualifications.

- Sex: Male or Female
- Citizenship: U.S. citizen
- Age: Age is determined by OPNAVINST 1120.5A and Title 10 U.S. code 532.
- Grade: The grade appointed is determined by the applicant's level of advanced education and training, professional experience, previous military service as a dental officer, or other commissioned service subject to OPNAVINST 1120.5.
- The applicant must be a graduate of dental school approved by the American Dental Association and have a current unrestricted license to practice dentistry in a state or territory of the United States, the District of Columbia, or the Commonwealth of Puerto Rico. Recent graduates of dental schools (within six months) may be appointed before licensing; however, they must obtain a current valid license within one year from the date of graduation from dental school. Those dentists from states that require a 5th year, post graduate year one (PGY-1), of training prior to licensure are allowed an additional six months to obtain their license.
- The applicant must be physically qualified per established standards and must meet the mental, moral, and professional qualifications as determined by a board of officers, the Dental Corps Professional Review Board (DCPRB), appointed by the Chief, Navy Dental Corps.
- Additional qualifications may be issued by the Chief of Naval Personnel. (pp. 6–7, 6–8)

7. Officer Accession Programs

OPNAV instruction 1110.1A outlines the administration of health professions accessions programs. The following is a brief description of each accession program that individuals can pursue to become a Naval dentist (OPNAVINST 1110.1A, 2007).

- Direct Procurement. Recruiting an officer directly from a civilian environment. Active duty and reserve-enlisted personnel can also apply for a commission through a Direct Procurement Program.
- Recall to Active Duty. The voluntary return of a commissioned officer from the reserve to active component.
- Interservice Transfer (IST). The transfer of a commissioned officer serving on active duty, between uniformed services; or the transfer of commissioned officers not on active duty, between the reserve components of the uniformed services.
- Health Services Collegiate Program (HSCP). Two- to four-year scholarship program in designated health professions to complete degree/certification requirements and obtain an officer commission in the active duty component of the Medical Service Corps (MSC), Dental Corps (DC), or Medical Corps (MC) upon graduation.
- Health Professions Scholarship Program (HPSP). HPSP is an Inactive Ready Reserve Program for students accepted to or enrolled in an accredited training program leading to a health profession degree. A sub-element of the HPSP is the Navy Active Duty Delay for Specialists (NADDS) Program. This Inactive Ready Reserve Program permits graduates of the HPSP to obtain graduate professional education in accredited civilian institutions. Reserve officers on the active duty list with remaining obligations are also eligible for the NADDS Program.
- Financial Assistance Program (FAP). FAP is an Inactive ready Reserve Program for physicians or dentists currently accepted to or enrolled in an accredited residency or fellowship program progressing toward a specialty which has been designated as critical to the Department of Defense (DoD).
- Health Professions Loan Repayment Program (HPLRP). HPLRP is an active duty and reserve program used to recruit qualified health professionals in specific specialties, Under the HPLRP, the Navy repays all or a portion of participant-incurred educational loan obligations (p. 2–3).

8. Promotions

Regardless of the size and scope, promotion opportunities exist in all the organizations and are based on the potential of individuals to perform at a higher rank or pay grade that demands more responsibility and decision-making. The officer promotion

plan is the basis for selection and promotion of regular and reserve officers on the active-duty list to the grades of Lieutenant Junior Grade through Captain and for Chief Warrant Officer. The officer promotion plan is governed by SECNAVINST 1420.1B.

According to the Manual of the Medical Department (2008):

> Officers of the Dental Corps become eligible for promotion when they accumulate the required entry grade credit or complete the prescribed period of active duty in the next lower grade as specified in SECNAVINST 1420.1B and Public Law 96-513 of 12 December 1980, Defense Officer Personnel Management Act (DOPMA), as issued to the military services by DoD Instruction 6000.13 series. (p. 6–8)

The Dental and Medical Corps of the Armed Services are all relieved from DOPMA constraints. The following guidelines are adhered to for promotion (B. Melody, personal communication, February 16, 2010):

- All three services use the six years Time in Grade (TIG). (Promotion Phase Points). Six-years TIG allows for a steady state promotion plan. It also locks these two communities into compliance to "Flowpoint" guidelines. Selects are expanded by opportunity and not IZ size. This allows time for training and experience, as most physicians and many dentists do not complete training until the 6–10 year period.
- MC and DC are not included in the congressionally set officer strengths, meaning the control grade limitations do not apply to these two corps. No cap exists on the number of control grade billets in these two corps. When Navy counts its control grade, medical and dental are excluded from the count.

9. Current Strength and Specialties

According to the Officer Community Manager monthly strength report, as of December 2009, 1,009 Dental Corps officers were serving on active duty, not including flag officers (B. Melody, personal communication, February 16, 2010). There are 17 specialties in the Navy Dental Corps, which are listed below with their specialty codes (Navy Officer Manpower and Personnel Classifications Manual, 2010).

- General Dentistry (1700)
- Endodontics (1710)
- General Dentist (Advanced Clinical Practice-ACP) (1724)

- Comprehensive Dentistry (1725)
- Maxillofacial Prosthodontics (1730)
- Orthodontics (1735)
- Operative Dentistry (1740)
- Oral Diagnosis (1745)
- Exodontics (1749)
- Oral Surgery (1750)
- Periodontics (1760)
- Prosthodontics (1769)
- Public Health Dentistry (1775)
- Oral Pathology (1780)
- Orofacial Pain (1785)
- Dental Research (1790)
- Pediatric Dentistry (1795)

10. Duty Assignments

The dental officers receive duty assignments based on the needs of the naval service. Duty assignments include, but are not limited to the following.

- Medical Treatment Facilities and Dental Treatment Facilities in the continental United States (CONUS)
- Afloat duty in the large combatant and auxiliary ships of the fleet
- Overseas duty with mobile construction battalions
- Duty with the U.S. Marine Corps Forces (Manual of the Medical Department, 2008, p. 6–10)

> The length of the tour follows the Bureau of Naval Personnel (BUPERS) policy and is influenced by various factors, which include, but are not limited to, the ratio of sea and overseas billets to those ashore within CONUS; the number of offices on active duty for limited periods; requirements for officers with special qualifications; billets of an unusually arduous nature or in isolated areas; training requirements; and the desires of the individual officer. (Manual of the Medical Department, 2008, p. 6–10)

11. Educational Opportunities

Educational opportunities play a significant role in building a strong and genuine employer-employee relationship. Educational opportunities not only enhance employees' productivity and performance, but also build a competent and capable workforce to handle complex issues in an efficient manner. The U.S. Navy offers enormous educational opportunities so that naval officers stay competitive in their professional assignments. Various educational opportunities presented to DC officers outlined in the Manual of Medical Department (2008) are listed below.

- PGY-1 Programs in Dentistry. Dental officers who come on initial active duty from dental school can apply for training in PGY-1 programs. Two types of PGY-1 programs available to dental officers are the following.
    - General Practice Residency (GPR). Programs in Dentistry of 12 months duration are conducted at naval teaching hospitals. The training programs are designed to advance the knowledge and broaden the clinical experience of the recently graduated dental officer and are focused on dentistry in a hospital-based environment.
    - Advanced Education in General Dentistry (AEGD). Programs of 12 months duration are conducted at various dental clinics. The training programs are designed to advance the knowledge and broaden the clinical experience of the recently graduated dental officer in all areas of general dentistry.
- Naval Residency Training. The Naval Postgraduate Dental School at the National Naval Medical Center, Bethesda, Maryland, offers residency training in comprehensive dentistry, endodontics, oral diagnosis, oral medicine, oral maxillofacial radiology, oral pathology, periodontics, prosthodontics, maxillofacial prosthetics, and public health dentistry. Residency training in oral and maxillofacial surgery is conducted at various naval teaching hospitals. Residency training in public health dentistry is conducted at the Uniformed Services University of the Health Sciences (USU) and the National Institute of Dental Research (NDR).
- Residency Training in Civilian Universities. Residency training programs in civilian universities are available in limited numbers to dental officers and are offered to satisfy part of the Navy's requirements for well-trained dental officers to practice, teach, and conduct research in the various disciplines of dentistry.

- Short Postgraduate Continuing Education Courses in Naval Facilities. Continuing education courses in various disciplines of dentistry are available to active duty dental officers of the Naval Reserve on a space available basis. These courses are designed and administered following the guidelines established by the American Dental Association and are available at the Naval Postgraduate Dental School, Bethesda, Naval Medical Center, Portsmouth, and Naval Medical Center, San Diego (pp. 6–12, 6–13).

12. Special Pays and Bonus

The public and private sectors compensate employees by offering monetary and non-monetary incentives to enhance retention and recruitment. Organizations, whether public or private, often review and make appropriate changes to their compensation policies to maintain a competent workforce capable of meeting the mission, vision, and goals of the organization.

> Military compensation is the pillar of the all-volunteer force. It is a fundamental policy tool for attracting and retaining personnel, and its structure – and the incentives applied by that structure – can affect U.S. service members' willingness to join, exert effort, demonstrate their leadership potential, remain in the military, and, eventually, exit the military at an appropriate time. Military compensation is a composite of current pay and allowances, special and incentive pays, health benefits, disability benefits, retirement benefits, and other benefits. Its importance to the readiness and morale of the force is such that it is reviewed every four years to determine whether its form and amounts are adequate to meet manpower objectives. (Asch, Hosek, Mattock, & Panis, 2008, p. iii)

The Navy utilizes special pays and bonuses as a tool to attract and retain DC officers. According to the fiscal year (FY) 2010 Navy Dental Special Pay Plan (B. Melody, personal communication, February 16, 2010), various special pays and bonuses that DC officers receive are as follows.

a. Variable Special Pay (VSP)

- VSP is an entitlement for Dental Corps officers serving on active duty for periods of at least one year.
- All Dental Corps officers on active duty are eligible for VSP beginning on the date of entry to active duty.

VSP is paid monthly at the following rates.

- $3,000 if undergoing internship training or has less than three years of creditable service
- $7,000 with at least three but less than six years of creditable service and not undergoing internship training
- $7,000 with at least six but less than eight years of creditable service
- $12,000 with at least eight but less than 12 years of creditable service
- $10,000 with at least 12 but less than 14 years of creditable service
- $9,000 with at least 14 but less than 18 years of creditable service
- $8,000 with 18 or more years of creditable service
- $7,000 for those in pay grades above O6

b. Additional Special Pay (ASP)

ASP is an entitlement for Dental Corps officers who agree to remain on active duty for a period of not less than one year as computed from the effective date of the ASP agreement.

ASP is paid annually at the beginning of the 12-month period for which the officer is entitled to such payment at the following rates.

- $10,000 with less than three years of creditable service
- $12,000 with at least three but less than 10 years of creditable service
- $15,000 with at least 10 or more years of creditable service

c. Board Certified Pay (BCP)

- BCP is an entitlement for Dental Corps officers who are board certified in a dental specialty recognized by the American Dental Association or Board Certification Equivalency (BCE).
- Entitlement to BCP is effective on the date of commencement of active duty, or the date the officer becomes board certified in the specialty, whichever is later.

BCP is paid monthly at the following annual rates.

- $2,500 with less than 10 years of creditable service
- $3,500 with at least 10 but less than 12 years of creditable service

- $4,000 with at least 12 but less than 14 years of creditable service
- $5,000 with at least 14 but less than 18 years of creditable service
- $6,000 with 18 or more years of creditable service

d. Dental Officer Multiyear Retention Bonus (DOMRB)

"DOMRB is a discretionary bonus paid to Dental Corps officers intended to alleviate the most severe shortfalls in dental specialties and is additive to all other dental officer special pays" (OPNAVINST 7220.17, 2005, p. 3–10).

To be eligible for the DOMRB, a Dental Corps officer must (FY10 Navy Dental Special Pay Plan) satisfy the following criteria.

- Be below the pay grade of O7
- Have a current, valid, unrestricted license or approved waiver
- Be free of education and/or training obligation
    - Has at least eight years of creditable service
    - Has completed any Active Duty service commitment incurred for dental education and training, and who has completed initial residency training, or is scheduled to complete initial residency training by September 30 of the year during which the residency is completed

Tables 2 and 3 reflect the DOMRB pay rates and levels as specified in the Dental Officer Special Pay Plan.

Table 2. DOMRB Pay Rates (From: FY10 Navy Dental Special Pay Plan, B. Melody, personal communication, February 16, 2010)

FY 2010 DOMRB Pay Rates				
Length of Agreement	**Level 1**	**Level 2**	**Level 3**	**Level 4**
Four Years	$50,000	$40,000	$35,000	$25,000
Three Years	$38,000	$30,000	$27,000	$19,000
Two Years	$25,000	$20,000	$18,000	$13,000

Table 3. DOMRB Pay Levels (From: FY10 Navy Dental Special Pay Plan, B. Melody, personal communication, February 16, 2010)

FY 2010 DOMRB Pay Levels	
Eligible Specialties	**FY 2010 Level**
Oral-Maxillofacial Surgeons	1
Comprehensive/Operative Dentistry	1
Endodontics	1
Prosthodontics	1
Orthodontics	1
Oral Pathology/Oral Diagnosis/Oral Medicine	1
Pediatric Dentistry	1
Periodontics	1
Public Health Dentistry	1
Temporomandibular Dysfunction/Orofacial pain	1
Dental Research	1
Exodontia (Advanced Clinical Practice - ACP)	3
Endodontics (ACP)	3
Dentistry (ACP)	3
Periodontics (ACP)	3
Prosthodontics (ACP)	3

e. Incentive Special Pay (ISP) for Oral and Maxillofacial Surgeons

A DC officer who is either an oral or maxillofacial surgeon is eligible for the ISP paid annually in the amount of $30,000 if he or she meets the following criteria (FY10 Dental Officer Special Pay Plan).

- Below the grade of O7
- Has a current, valid, unrestricted license or approved waiver
- Has completed specialty qualification before October 1 of the year during which the specialty qualification is completed
- Executes a written agreement to remain on Active Duty for a period of not less than one year beginning the date the officer accepts the award of ISP

E. SCOPE

The scope of this research is limited to Dental Corps officers in the Navy and utilizes the results of the "Naval Dental Corps Non-Monetary Incentives Retention Survey" to design the model. The survey is to be distributed to approximately 1,000 naval

dental officers. This research encompasses the combination of non-monetary incentives valued by dental officers in the design of the model, and consequently, obtaining the benefits to the Navy in employing the CRAM as a recruitment and retention tool. Although the focus of this research is limited to the dental officers in the Navy, the outcomes of this study can be used to monitor the retention behavior, as well as the benefits assignment to any specialty, pay grade, and service in the Department of Defense.

F. ORGANIZATION

This research is organized in a way that provides the reader with the major aspects starting from the history and current structure of the Navy DC. Chapter II covers the literature review and highlights previous retention research and findings, as well as provides an in-depth review of the effect of motivation on retention. Chapter III explains the various retention mechanisms and the model used in determining the benefits. Chapter IV outlines and analyzes the results obtained from the survey distributed to the DC community. This research concludes with Chapter V in which the authors provide a summary and conclusions of this thesis, and recommendations for further research.

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II. LITERATURE REVIEW

A. INTRODUCTION

It is important to create a balance between intrinsic and extrinsic motivation to augment employees' personal and professional growth, and provide means for employers to find solutions to retention, recruitment, and other work-related challenges. Employers in the private and public sectors provide incentives to employees to enhance motivation, which in turn allows for employees' personal and professional growth. These incentives not only create a competent workforce, but also facilitate the employers in overcoming their recruiting and retention challenges, especially in a competitive environment. These incentives present an ultimate advantage to the employer in terms of financial, as well as workforce, security and gains. Some of the most common reasons that persuade employers to provide incentives are meeting recruiting goals, retaining valuable employees, and developing a talented workforce capable of achieving an organization's mission, vision, and goals.

The U.S. military requires service members to go above and beyond their normal duties as compared with other public and private sector employees, especially during wartime operations. Due to the escalation in Overseas Contingency Operations (OCO), military personnel experience significant pressure in both their personal and professional life. To meet the mission successfully, U.S. military personnel devote themselves to protect the freedom of America and its citizens at home and abroad. The devotion requires personal sacrifice; the level of expectation of U.S. military personnel depends on the nature of the job being performed and its relevance to the mission of the U.S. military services.

The focus of this thesis is the Navy Dental Corps community because of the challenges encountered in retaining highly skilled dentists despite the regular increase in monetary incentives, such as special pays and bonuses. It is evident from previous research that, once the extrinsic motivation is either satisfied or exceeded, employees turn toward satisfying intrinsic motivation. The authors hope this research reveals some

opportunities to increase retention for the Dental Corps (DC) and to create an environment in which service members are more satisfied in their personal and professional life. Additionally, they hope that this research forms the basis for future exploration and implementation, not only in the Navy DC, but in other communities across the services in the public sector.

B. TYPES OF MOTIVATION

1. Intrinsic Motivation

According to a study by Ryan and Deci (2002, p. 256), intrinsic motivation is the "inherent tendency to seek out novelty and challenges, to extend and exercise one's capacities, to explore, and to learn." In most cases, possessing intrinsic motivation during the activity or work provides its own reward. People say that when one finds a job that he or she would do for nothing, that person has found a calling. This is what intrinsic motivation is all about. It is not a typical feeling in the workplace, because inevitably things about a job or certain projects are not rewarding but need to be done. As Ryan and Deci (2002) write, "Being given a particularly exciting assignment, with no undue pressure to succeed, can be challenging and carry with it a satisfaction that is distinctly enjoyable" (p. 256).

2. Amotivation

According to a study by Deci and Ryan (1985), "Amotivation describes a sense of futility in an engagement, with an individual not valuing the activity, not feeling capable of doing it, or not expecting to achieve a desired outcome for having done it" (p. 258). This type of motivation is really de-motivation. It is a feeling of not being motivated at all because of circumstances and the belief that what one is doing really will not matter or is not interesting. A person either avoids a task altogether or just goes through the motions of completing it.

3. Self-Regulated Extrinsic Motivation

According to Ryan and Deci (2000), "Self-regulated extrinsic motivation describes a state in which one engages in an activity or a relationship primarily to obtain some separable outcome but still has a clear sense of volition" (p. 258). Additionally, as Baard (cited in Deci and Ryan, 2002) writes:

> Nearly everyone goes to work to earn a living but, when given sufficient control of how a job gets done—being empowered, in contemporary managerial jargon-the motivational experience contains many elements associated with intrinsic or self-motivation. In such situations if the rewards are not made overly salient in an attempt to motivate or control people, the people may be self-determined even though they are working for extrinsic rewards. The experience and consequences of this self-regulated extrinsically-motivated behavior can approximate those of intrinsic motivation and accordingly increase the likelihood of positive outcomes. (p. 258)

As illustrated in Figure 3, Gagne and Deci (2005) noted:

> Self-Determination Theory posits a self-determination continuum. It ranges from amotivation, which is wholly lacking in self-determination, to intrinsic motivation, which is invariantly self-determined. Between amotivation and intrinsic motivation, along this descriptive continuum, are the four type of extrinsic motivation, with external being the most controlled (and thus the least self-determined) type of extrinsic motivation, and introjected, identified, and integrated being progressively more self-determined. (p. 335)

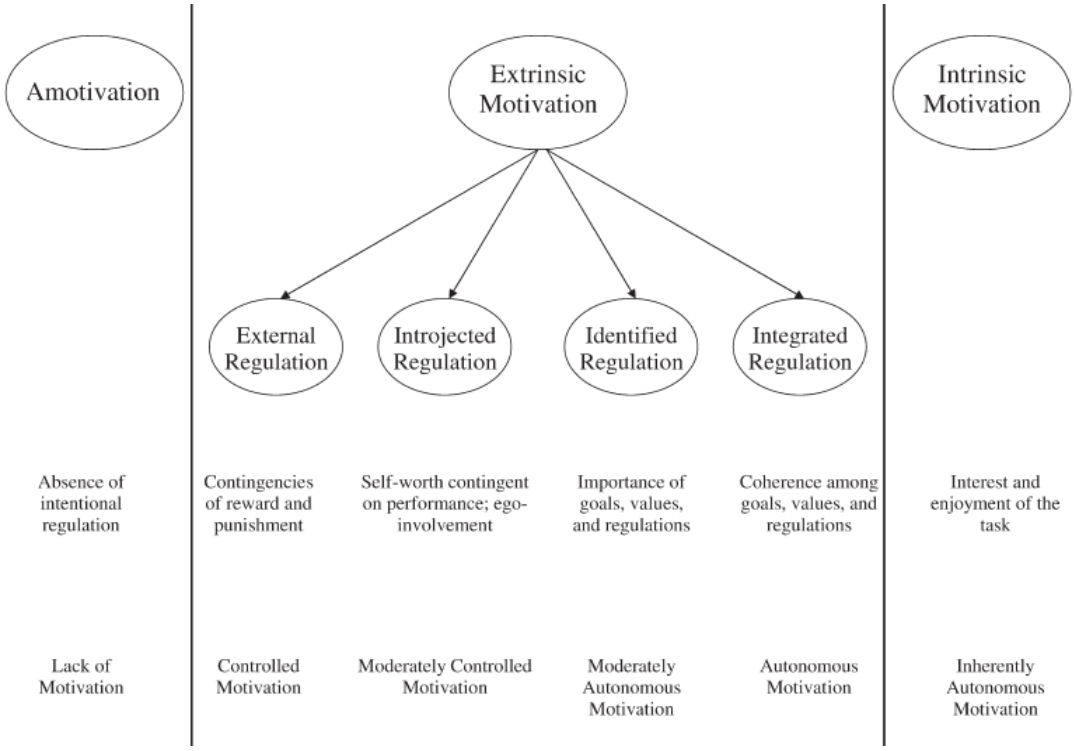

Figure 3. Self-Determination Theory (From: Gagné & Deci, p. 335)

C. INTRINSIC AND EXTRINSIC REWARDS

Having discussed some aspects of intrinsic and extrinsic rewards, it is necessary to examine what has been done in the past, and more specifically, with the DC. In the past, the Navy has primarily focused on monetary compensation (extrinsic rewards) to retain dental officers. The Navy, and the military in general, have continued to raise bonuses; however, retention continues to decline. Why is this? Well, author Kenneth Thomas (2000) has noted that extrinsic rewards only last for the short term, and when individuals become financially stable, they then ask themselves: what do I contribute? Am I an integral part of something? Do I make a difference? These questions cannot be answered with money, perks, or increased benefits; they can only be answered within one's self. Extrinsic rewards and intrinsic rewards support each other. As Thomas (2000) observes:

> Over the long haul, people need intrinsic rewards to keep going and to perform at their peak. The mobility and "free agency" has created greater competition for skilled workers between organizations. For example, it will be important to keep adjusting benefits to the needs of the new workers—providing things like flextime, flexplace, childcare, and eldercare. We are now at the point where the biggest gains will come from systematically improving intrinsic rewards—making the work itself more fulfilling and energizing so that workers don't want to leave it. (pp. 8–9)

An individual must be self-satisfied, and feel as though he or she has ownership. Workers today need to feel they are able to self-manage their work. In other words, they need to have autonomy to make decisions and in completing tasks, and to realize what they are doing makes a difference. It involves creating a deeper passion for what workers are doing. This passion is different for every individual and can only be managed properly with the right leadership and a thorough knowledge of one's employees.

1. Four Intrinsic Rewards

Thomas (2009) identifies four intrinsic rewards linked to self-management, "Self-management requires that the worker make judgments-of the meaningfulness of the task purpose, the degree of choice available in selecting activities, how competently he or she is performing those activities, and the amount of progress being made toward the task purpose" (pp. 47–48). These intrinsic rewards can generate the feeling or "sense of meaningfulness" in the mind of the employee about his or her job (Thomas, 2009, p. 48). Below are Thomas' brief descriptions of the four intrinsic rewards, in the order they occur during the self-management process. They have been adapted from the *Work Engagement Profile (WEP)* that Tymon and Thomas (2009) developed to measure them.

- A sense of *meaningfulness* is the opportunity you feel to pursue a worthy purpose. The feeling of meaningfulness is the feeling that you are on a path that is worth your time and energy—that you are on a valuable mission and that your purpose matters in the larger scheme of things.
- A sense of *choice* is the opportunity you feel to select activities that make sense to you and to perform them in ways that seem appropriate. The feeling of choice is the feeling of being able to use your own judgment and act out of your own understanding.

- A sense of *competence* is the accomplishment you feel in skillfully performing the activities you have chosen. The feeling of competence involves the sense that you are doing good, high-quality work.
- A sense of *progress* is the accomplishment you feel in achieving the purpose. The feeling of progress involves the sense that your work is moving forward, that your activities are really accomplishing something (p. 50).

D. MONETARY AND NON-MONETARY INCENTIVES

The two types of incentives that employers generally offer to their employees are monetary and non-monetary in nature. Monetary incentives include money as a form of compensation, whereas non-monetary incentives include opportunities as a form of compensation. Monetary incentives include profit sharing, bonuses, stock options, paid vacation, etc. Non-monetary incentives include flexible work schedules, sabbaticals, educational opportunities, telecommuting, and so on. The types of incentives to be offered to employees vary from individual to individual and are also contingent on budget constraints, and most importantly, the objectives to be achieved by offering the incentives.

Monetary and non-monetary incentive packages in the civilian sector are usually custom-designed per individual. This custom type of incentive program allows a company to spend its money wisely and only offer incentives that the employees value. As a result, the employees are happy because they have received a compensation package that is valuable to them, and the company is happy that it has an employee motivated by the available incentives. This kind of relationship promotes an environment of trust and loyalty, and makes the possibility of retaining a valued employee all the more likely.

E. NEED FOR COMPETITIVE INCENTIVES

Why is it necessary to provide tailored competitive incentives to employees? It is important to identify the type of incentives desired by employees to ensure optimal results. In Nelson's study (cited in Ballentine, Mckenzie, Wysocki, Kepner, 2003), different generations prefer different incentives and the preference depends on employees' personal and professional goals. As Ballentine et al. (2003) point out, "The

bottom line is that incentives must be tailored to the needs of the workers rather than using the 'one size fits all' approach, which is impersonal and sometimes ineffective" (p. 2). "One size fits all" is a typical approach implemented across the services, such as GI Bill benefits, Tuition Assistance benefits, etc. Table 4 lists some of the non-monetary incentives desired by different generations of associates.

Table 4. Non-Monetary Incentives Desired by Different Generations of Associates (From: Ballentine et al., The Role of Monetary and Non-Monetary Incentives in the Workplace as Influenced by Career Stage, p. 3)

Mature Workers	Baby Boomers	Generation X'ers	Generation Y'ers
Flexible schedules	Retirement planning	Flexible work schedules	Flexible work schedules
Part-time hours	Flexible retirement options	Professional development	Professional development
Temporary hours	Job training	Feedback	Feedback
	Sabbaticals	Tangible rewards	Tangible rewards
		Work environment	Work environment
			Attentive employers

F. THE NEW WORK ROLE

Thomas (2000) is firm in defining the "new work role" in modern organizations: "The new work role is more psychologically demanding in terms of its complexity and judgment, and requires a much deeper level of commitment. While economic rewards were pretty good for buying compliance, gaining commitment is a far different matter" (p. 5). The focus of this research is the Navy Dental Corps community, which is at risk of recruiting and retention challenges due to the lucrative nature of the dental profession in the civilian sector. The role of a naval dentist is demanding, especially due to the continuous increase in the OCO. Consequently, it is important to recognize the factors that affect dental officers, personally and professionally. Thomas (2000) describes these factors:

> With today's work, on the other hand, motivational issues are more complex and demanding. Close supervision and detailed rules are no longer as possible. Workers now need to be more self-managing. Self-management, in turn, requires more initiative and commitment, which depend on deeper passions and satisfactions than extrinsic rewards can offer. Finally (and fortunately), the new work has the potential for much richer, intrinsic rewards. Intrinsic rewards come to workers directly from the work they do—satisfactions like pride of workmanship or the sense that they are helping a customer. (p. 7)

Previous research has shown that money is not the only factor that enhances recruitment and retention; other, non-monetary incentives, increase employees' intrinsic motivation, thus leading to significant job satisfaction, which in turn, leads to achieving high recruitment and retention goals. Organizations are moving away from the traditional approach of offering extrinsic rewards in the form of money, and are adopting a more responsive approach of offering non-monetary incentives to attract and retain talented individuals. Thomas (2000) continues:

> Intrinsic rewards also produce benefits of increased job satisfaction and worker retention. Previous research shows that intrinsic rewards are consistently related to job satisfaction and performance. These findings hold across types of organizations and for managers as well as workers. Studies have also shown that the intrinsic rewards are related to innovativeness, commitment to the organization, and reduced stress. (p. 46)

To date, many writers have discussed this subject. Creating a portfolio that satisfies the needs of both the employees and employers can be a difficult process. The complexity lies in determining incentives, because employees in different contexts can behave differently. Employees differ, as well, in their taste and value attributed to a particular incentive, whether monetary or non-monetary. It is, therefore, essential to study individual behavior in a manner that provides satisfaction to employees while meeting the needs of the employer.

The next task that arises from the discussion is to identify the type of incentives valued by the employees and which are also beneficial to the employer. Furthermore, it is important to categorize and evaluate the type of motivation enhanced by offering monetary and non-monetary incentives, i.e., intrinsic or extrinsic factors. Categorizing,

evaluating, and creating a balance between intrinsic and extrinsic rewards is vital in building and sustaining a strong and secure relationship between employers and employees.

G. LEADERSHIP

Leadership is obviously an essential piece in creating an environment where employees have autonomy to make decisions and can be fulfilled by what they do. In this case, purpose-driven leadership is necessary. To achieve a type of self-management environment, those being led need to identify with a purpose. That is, what purpose does their work serve? As a leader, one needs to be able to understand the purpose and communicate it in such a way as to impassion employees. To create an environment of creativity and self-sufficiency should be the goal. Long gone are the days of creating a book full of rules, then standing over employees to ensure that they accomplish their tasks while adhering to the rules.

Leaders today must not just empower employees, but impassion them. They need to communicate the purpose of not only the work properly but of the organization as well. This is a fundamental responsibility of leadership in the purpose-driven leadership model. This model relies on open leadership communication with employees and letting them know that they have autonomy to make decisions and are stakeholders in how well the company performs. This allows employees to feel a sense of purpose (almost patriotism) inside and, therefore, creates an atmosphere of creativity, innovation, and engagement.

H. THE CHALLENGE

The challenge, then, is to focus on the DC to find the possible techniques to create intrinsic rewards rather than focusing on the extrinsic side alone. In this research, the focus is on non-monetary incentives, which has been discovered to be more valuable to DC officers. The authors believe that, through the offerings of sabbatical, choice of platform, two consecutive tours in same geographic location (homesteading), and

postgraduate education, the results are more cost-effective than strictly monetary incentives for the Navy. Consequently, it also attracts DC officers to retain through intrinsic rewards generated from receiving these non-monetary incentives.

Thomas (2009) also discusses a couple of studies that specifically examined retention and intrinsic rewards. A study by Sutz (cited in Thomas, 2009), for example, found that those who scored higher on intrinsic rewards on the Work Engagement Profile scale are related to a stronger intention to remain in the organization. At the same time, a study by Sparrow (cited in Thomas, 2009) found "hospitality workers' intent to remain on the job was much more strongly related to the intrinsic rewards than to pay" (p. 70). These examples are important because they show how workers are intrinsically motivated and engaged rather than enticed and less engaged by an extrinsic reward that may only motivate them for a short period of time.

I. CONCLUSION

In conclusion, it must be said that the Navy can never retain all DC officers. In fact, that is not what they want, and is not realistic. The DC has retention goals by accession cohort and specialty mix to support the correct number of specialty trained officers to meet billet requirements in support of Navy and Marine Corps Dental Readiness. The requirement is to retain a healthy number of DC officers by specialty and pay grade to meet both clinical needs and maintain senior leadership capability for the future. It is first necessary to understand that only certain types of individuals exist who are inclined to complete a career in the military. Then, it is essential to accept that even if all the intrinsic motivators are met, it may not be enough to keep someone in the military. More cons than pros may exist for those who contemplate continuing a military career (for example, the possibility of going to war or being deployed and away from family). It may be possible to make a service member's stay more comfortable, but there is no guarantee that the benefits of military service can outweigh the costs. The take-away from this study is that using purpose-driven leadership along with self-management creates an atmosphere where DC officers are more likely to be retained. The most important aspect of this entire process is to find ways to distribute monetary and non-

monetary incentives that maintain a balance between intrinsic and extrinsic motivation, which in turn, strengthens both the service member's allegiance to the Navy and the Navy as a whole.

J. PREVIOUS RETENTION STUDIES

Through information gathered from Dental Corps (DC) detailers, community mangers, specialty leaders, and career planners, the major issue in the DC currently is that the Navy only retains about 30 percent of its dental officers at five years of commissioned service. Dental officers who enter the Navy receive some form of bonus or special pay during their career. However, this thesis reviews the possibility of offering some non-monetary incentives as well. The task of this research is to ascertain if a combinatorial retention auction mechanism (CRAM) offering a portfolio of non-monetary and monetary incentives provides a more cost-effective means to influence retention behavior of O-3 and O-4 Navy dental officers than an auction offering monetary incentives alone.

Non-monetary incentives (NMIs) make it easier for workforce planners to offer incentives at a lower cost to the Navy, while allowing individual sailors to create a package of most value to them. NMIs have been used in the civilian workforce for many years but have just, in the last few years, been considered an option for the military.

This thesis extends previous theses (LT Anderson, LT Zimmerman, LT Ellis, and LT Christian), all of whom explored an auction mechanism to determine best possible solutions for retaining personnel. LT Anderson's and LT Christian's theses, because they are specific to the DC, are even more insightful for this research. Each thesis had its own twist on how it utilized the auction mechanism and which population was used. Each thesis is influential in this research in its own way and is explained in the following sections.

1. LT Ellis' Thesis

The first thesis discussed is *Variability of Valuation of Non-Monetary Incentives*: *Motivating and Implementing the Combinatorial Retention Auction Mechanism* by LT

Ellis. This thesis "explores the concept of preference variability relative to non-monetary and monetary incentives in the CRAM" (Ellis, p. v). He used the Bureau of Naval Personnel Quick polls to help explain the kinds of NMIs in which the sailors were interested. He concentrated on three: 2004 Surface Warfare Officer quick poll, 2005 Medical Officer Quick poll, and the 2007–2008 Retention Quick poll, to help explain what influences sailors to stay in the Navy. The results of the polls are discussed as follows.

a. Bureau of Naval Personnel Quick Polls

The Bureau of Naval Personnel conducts research for the Department of the Navy, including surveys designed to determine sailor's satisfaction with all aspects of Naval service. Generally, these surveys are fielded as "Quick Polls" designed to test the "pulse" of the Navy. Sailor satisfaction is a key indicator of retention propensity and probability, the results of which can provide useful information for personnel planners. Below is an example of a quick poll administered to surface warfare officers in 2004. This quick poll was important to this research because it provided insight to the attitudes of sailors from the surface warfare community, which had a similar attrition rate as the DC. This could be useful in determining possible non-monetary incentive options and the expected inputs for the DC because of these similarities. An example of how effective non-monetary incentives can be can be gleaned from this 2004 quick poll.

b. Surface Warfare Officer Quick Poll

The NPRST office returned a phone call on 30 December 2009 and provided the number of total surveyed, the number of total respondents and response rate.

- Poll was open from 2–14 June 2004
- 4,448 Junior and mid-grade (O1-O4) Surface Warfare Officers surveyed
- 2,128 respondents (47.8 percent response rate)
- "A number of incentives, including guaranteed education and geographic stability after Department Head tours ranked higher than SWO Continuation Pay (SWOCP)" as affecting potential continuation decisions

- Results indicated that increasing the level of SWOCP would likely increase continuation intention rates (Navy Personnel Research, Studies, and Technology (NPRST) (2004); Surface Warfare Officers (SWO) Continuation Intentions Quick Poll, Millington, TN: C. Newell; K. Whittam; Z. Uriell).

c. Medical Department Officer Quick Poll

This next quick poll gives insight into the types of incentives the medical community might prefer. The following corps' were included in this poll: Dental Corps, Medical Corps, Medical Service Corps, and Nurse Corps. This particular poll gives a good snapshot of what the medical community values and needs to retain sailors in the Navy. These quick polls, along with other resources, helped facilitate the development of this research survey by providing a basis of ideas for what DC officers might require for non-monetary incentives. This research and forethoughts on possible NMIs for the DC were strengthened by the review of these quick poll results. The authors contacted the Quick Poll office on 23 December 2009 and left a message. The NPRST office returned a phone call on 30 December 2009 and provided the number of total surveyed, number of DC officers who responded, the number of total respondents and response rate.

- Poll was open from 11–23 May 2005
- 10,872 Medical Department Officers
- 3,582 Respondents (33 percent response rate)
- 403 of approximately 1129 (35 percent) dental officers responded
- Across the Medical Department, both choice of job assignment and choice of geographic location for next assignment ranked higher than retention bonus, in terms of increasing the likelihood to remain on active duty (Navy Personnel Research, Studies, and Technology (2005); 2005 Medical Officer Quick Poll, Millington, TN: C. Newell; K. Whittam, Z. Uriell).

d. 2007 Retention Quick Poll

The last poll reveals information on retention in general, for both officers and enlisted personnel. Interestingly enough, the NMIs are similar to what this thesis

suggests offering to the DC. Even more revealing would be to ascertain whether, if given all of the NMIs, would combinations of NMIs be complementary or substitutes (sub/super additive).

- Poll was open from 6 December 2007–9 January 2008
- Random sample of 8,000 participated
- 43 percent response rate
- Top three influencers to reenlist/continue service:
  - Enlisted: Increase base pay; choice of geographic location; increase bonus
  - Officer: Increase base pay; choice of geographic location; choice of next assignment (Navy Personnel Research, Studies, and Technology (2007); 2007 Retention Quick Poll, Millington, TN: Schultz, R.; C. Newell; K. Whittam, Z. Uriell)

2. LT Anderson's Thesis

The second closely related thesis is *The Potential Impact of an Auction Based Retention Bonus and other Factors on the Continuation Rates of General Dentists Completing their Initial Obligation* by LT Robert Anderson. LT Anderson used a logistic regression to determine if the commissioning sources of 516 dentists, commissioned between the years of 1998 and 2001, made a difference in whether or not the officers "continued military service" (Anderson, p. 59). Results from his logistic regression estimated general dentists, who entered the Navy through Direct Commissioning (recruiting designator 2200) and the Dental Student programs (recruiting designator1925i), were 29 and 20 percent percentage points, respectively, more likely to continue beyond their initial obligation compared to those officers accessed through HPSP (recruiting designator1985). However, these programs have not been as successful as HPSP in recruiting dentists, as nearly 60 percent of Navy general dentists are accessed through HPSP. In Anderson's model results, HSCP was not found significant with a 1.9 percentage point continuation rate beyond their initial obligation. Dentists commissioned between the ages of 30 and 39 are more likely to continue service beyond their initial obligation than younger dentists (Anderson, p. 59).

Beyond the logistic regression, his research explored the impact of an auction based retention bonus for general dentists to counter the attraction of the civilian sector. His auction research focused specifically on purely monetary bonus and did not include NMIs. He used the difference between average military pay and civilian general dentist salaries to represent opportunity costs. In his model, the theoretical opportunity cost was calculated to be $69,000. Further, in his thesis, the Navy was looking to retain 78 out of 130 dentists with 58 agreeing to stay for an additional five years (40 in the flexible force option), the length of the multi-year contract. Therefore, the model assumed a low probability of a one-year bonus (.15) (Anderson, p. 59).

The model predicted the Navy could buy the services of 58 general dentists (40 in the flexible force option) at the end of their initial obligation for five years with a $69,000 annual bonus ($57,000 in the flexible force option). An additional 20 dentists (38 in the flexible force option) would agree to an additional year for $70,000. Although these numbers seem extreme, their high values are not a surprise, as the only opportunity cost examined in this illustrative model was compensation. Actual bids from Navy general dentists will reflect true opportunity costs, and are anticipated to be lower than in this theoretical model (Anderson, p. 60).

These bids are important to note because this thesis also uses an auction mechanism; however, it is a mechanism that incorporates both monetary and NMIs (e.g., homesteading, sabbatical, etc.). This research also focuses on the DC but concentrates more closely on the senior O-3 and junior O-4 DC officers in every specialty, not just general dentists. It tries to determine what incentives, outside of monetary compensation, are required to retain dentists past their initial obligation.

This thesis also compiles demographic information, such as dental school graduated from and GPA, using a survey that asks questions regarding monetary and NMIs. It asks dentists to state an acceptable bonus amount for retention, and then asks them how much of it they are willing to forfeit to receive a NMI and combinations thereof. A question is also asked about the specific value of dentists in the Navy. More specifically, the question asks, what makes one dentist more valuable to the Navy than another? This question, along with the demographic data, helps to draw some conclusions

about the population, and what they value as individuals, as a group, and possibly, provide the type of characteristics that the most valuable dentists possess. This, in turn, may give a hint as to the type of NMIs dentists with these types of characteristics value, allowing the Navy to market these NMIs to retain the most valuable dentists.

3. LT Brook Zimmerman's Thesis

Another thesis that utilizes some of the same techniques followed in this thesis is *Integrating Monetary and Non-monetary Reenlistment Incentives Utilizing the Combinatorial Retention Auction Mechanism (CRAM),* by LT Brooke Zimmerman. LT Zimmerman looked at finding the optimal mix of monetary and non-monetary incentives to retain Air Traffic Controllers and Fire Controlman. Her model design was the basis for the model used in this thesis. Her model was extremely extensive including twelve non-monetary incentives and one monetary incentive. The model provided 113 options and a multitude of combinations from which the involved sailors could chose.

LT Zimmerman's research not only looked at the retention of the two groups but also examined the cost savings for the Navy. She wanted to find the best mix of what sailors wanted and match that with the cost to the Navy. Her objective was to meet the Navy's retention target while minimizing the cost to the Navy of meeting that target. This is only possible by optimizing the auction mechanisms for both monetary and non-monetary incentives.

Her thesis showed that combining monetary and non-monetary incentives using the CRAM could retain people longer at a decreased cost to the Navy. She compared three mechanisms: a purely monetary auction, a Universal Incentive Package (UIP) auction, and the Combinatorial Retention Auction Mechanism (CRAM) to determine the optimal mix and mechanism to reduce the Navy's cost while maintaining value to the sailor. The purely monetary auction is self-explanatory. CRAM has already been discussed; however, a UIP might need more explaining. A UIP is an incentive offered to everyone, regardless of how much they value it; for example: Transferability of the Post 911 GI Bill. This particular benefit is offered to all military service members; however, research shows "that an across-the-board benefit such as GI Bill Transferability

significantly reduces the positive surplus when sailors who have a Value of Transferability less than the Cost of Transferability nonetheless exploit this benefit (Lay, p. V). By comparing these three mechanisms, LT Zimmerman could compare strengths and weaknesses, and cost savings for each mechanism. In the end, she demonstrated that CRAM cost savings ranged between 25–80 percent compared to monetary incentives alone.

This thesis uses LT Zimmerman's approach with DC officers, and includes creating a survey to determine what dental officers value beyond and including monetary incentives. It also utilizes CRAM to determine cost savings and sailor value based on the survey results. It then examines how the Navy can created a plan that incorporates these incentives, and eventually, retains more of the senior O-3 and junior O-4 dentists.

4. Alan Christian Study

Another study, *Influences on the Retention of Residency-Trained and Non-Residency Trained Navy Dental Corps Officers*, by Alan Christian examined ways to determine the critical factors influencing the retention of junior Navy Dentists after completing their initial obligation. Christian's research attempted to "identify key influences on the retention of junior Navy Dental Officers beyond their post-obligation period, the factors that influence more senior Dental Officers who have completed a residency program to remain on active duty beyond the obligation incurred as a result of residency training, and how timing of residency training in a Dental Officer's career affects the likelihood of staying past his or her obligation." Two sample groups were selected for this study, (1) dental officers who did not receive a Navy sponsored residency program and (2) dental officers who completed a Navy sponsored residency program. Using logistic regression and data supplied from the BUMED Manpower Information System (BUMIS), the study revealed that accession source, dental specialty and the number of operational tours as a percentage of total tours an officer completes during his or her obligation period were significant factors for retaining dental officers in the Non-Residency Model. Significant factors identified for the Residency Model were

gender, age when first paid as a Navy dentist, and the number of years dental officers waited to begin a Navy-sponsored residency program and dental specialty" (Christian, p. 1).

Christian's findings contribute to this thesis because they provide some insight into why some dentists decide to leave the Navy. By studying this research, new NMIs can be examined and applied to contend with the issue of mid-grade officers not obligating past their initial payback tour. Christian's research also shows that officers with a subspecialty in Endodontics, Comprehensive Dentistry, Oral Surgery, Periodontics and Prosthodontics (Spec1) are significantly more likely to stay in the Navy than are officers entering with other subspecialties. (Christian, p. 70)

The above specialties data is interesting because specialty leader interviews in this research indicated Endodontics, Oral Surgery, and Prosthodontics were a few of the specialties in which the Navy is currently having problems meeting retention targets; particularly for oral surgeons. According to the author's research, oral surgeons seem to have the best opportunity for much higher salaries in the civilian sector than in the military. Even the current economic recession has not affected their decision to leave for a high-paying job in the civilian sector. Christian's findings, as discussed previously, should be discounted as the current retention rates for these specialties are lower than other specialties.

K. SUMMARY

All the theses discussed above had a significant effect on this current research, from helping to define which NMIs were appropriate for the DC to creating an appropriate survey and simulation model. Each thesis was designed for its own research but left room for follow on research utilizing the same tools and techniques for discoveries in other officer and enlisted communities. This current research has taken the next step, and has hopefully, left room for others who come after to take the next step as well.

III. DATA AND METHODOLOGY

A. DATA

The initial step in the data collection was to design the survey. After meeting administrative requirements to launch the survey, the survey was distributed to Dental Corps (DC) officers in the Navy in the pay grades from O-3 to O-6. The survey was distributed electronically using SurveyMonkey, an online survey tool providing discrete mechanism for data collection.

This online tool not only provides a user friendly, anonymous access to individuals completing the survey, but also enhances the data collectors' ability to collect and analyze data. Using an online tool is advantageous to the respondents, as well as the researchers; however, it limits access to individuals serving in remote areas where technical capabilities are either limited or nonexistent.

The survey, included in Appendix A, integrated 27 questions in which 19 questions were designed to capture the demographics of the individuals completing the survey, such as age, gender, pay grade, years of active commissioned service, etc. The survey also included open-ended questions to expand responsiveness through the respondents' knowledge and experience. One of the open-ended questions provided an opportunity for respondents to present any other non-monetary incentives not listed in the survey that they felt had significant value. Another open-ended question asked the individuals to list measurable characteristics that increased a dentist's value to the Navy.

The results of the 2009 CNA study titled "Navy Medicine: Are We Taking Care of Our People?" were useful in generating the survey questions. The Dental Corps Community Manager provided consultation in coordinating communication for the execution, as well as the survey distribution.

B. METHODOLOGY

Qualitative and quantitative methodology was integrated in this research to determine if the Combinatorial Retention Auction Mechanism (CRAM), offering individualized portfolios of non-monetary and monetary incentives, provided a more cost-effective means to influence retention behavior than offering monetary incentives alone. Various auction mechanisms presented by Professor Coughlan, as discussed in LT Zimmerman's thesis, are included in Appendix B.

1. CRAM

The CRAM is the primary auction mechanism discussed in this research. The CRAM is a second price auction providing military personnel with an individualized incentive package, including both monetary and non-monetary incentives (NMI), based on individual preference and value for these incentives. The CRAM is used in this research to illustrate how individualized incentive packages can be more cost effective for the Navy while building a more satisfied workforce capable of accomplishing the mission. CRAM's scope is not just limited to the Navy but can be adapted to any military service, pay grade, or specialty.

The CRAM incorporates three elements—each serves a separate purpose.

- Second Price Auction provides accuracy in setting bonus level
- Non-monetary incentives provide lower cost to retain sailors with value > cost for those NMIs;
- Combinatorial auction provides individualized incentive packages with no "wasted" incentives (Zimmerman, 2008).

> Under the CRAM, a retained Sailor receives a particular NMI only if he values the incentive more than it costs the Navy to provide. This eliminates the need to determine which incentives to offer. All incentives are offered to all Sailors and allocated to those whose value exceeds cost. (Zimmerman, 2008)

2. Universal Incentive Package (UIP)

> The simplest way to incorporate non-monetary incentives (NMI) is to offer a "one-size-fits-all" package that combines a predetermined portfolio of NMIs coupled with a cash bonus. To reach retention goals more efficiently than with money alone, the cash payments must be reduced sufficiently to cover the cost of providing the NMIs. If the Sailors value these NMIs more than the Navy's cost to provide them, the total value delivered to Sailors exceeds the cost of delivery. The participants would be offered a fixed package of incentives and would submit a cash (requirement) bid to supplement that package. The auction would then follow the same process as the monetary-only auction. (Zimmerman, 2008)

3. Monetary Incentive

This is the simplest form of incentive programs. It uses only money as an incentive to retain individuals. Generally, the amount of monetary incentive to be offered is obtained using historical data.

C. MONTE CARLO SIMULATION

Monte Carlo simulation was used because of its user friendliness. The results not only include what can happen but also include the likelihood of it happening. The Monte Carlo simulation provides a broader picture of possible outcomes.

> Monte Carlo simulation performs risk analysis by building models of possible results by substituting a range of values—a *probability distribution*—for any factor that has inherent uncertainty. It then calculates results over and over, each time using a different set of random values from the probability functions. Depending upon the number of uncertainties and the ranges specified for them, a Monte Carlo simulation could involve thousands or tens of thousands of recalculations before it is complete. Monte Carlo simulation produces distributions of possible outcome values. (Monte Carlo Simulation, n.d.)

D. DATA COLLECTION PROCESS

This research is an extension of previous economic research using monetary and non-monetary incentives to study the retention behavior of military personnel. Professors

Gates and Coughlan provided the framework for this research. Previous student theses were also used as a reference. The data collection process involved the following steps.

- The authors gathered information from the DC key players, such as DC Community Manager, DC Detailers, DC Career Planner, etc., which ensured a better understanding of the retention challenges faced by the DC community. Consequently, this allowed the authors to develop a strategy to take the next step of designing a survey that could help overcome the challenges.
- Based on the information collected from the DC key players, a survey was designed using SurveyMonkey, an online survey tool. The survey titled, "Naval Dental Corps Non-Monetary Incentives Retention Survey," was designed to capture the basic demographic information, as well as intrinsic and extrinsic factors valued by the DC officers. Additionally, the survey included questions that would determine the willingness of DC officers to forego monetary bonuses to receive non-monetary incentives and combinations thereof.
- The survey was discussed with various subject matter experts to ensure that the survey met the research requirements and was designed in a manner allowing the authors to analyze, conclude, and recommend further measures to be taken for the DC to make informed decisions to enhance retention and aid in recruiting dental officers in the Navy.
- The survey was forwarded to the Institutional Review Board (IRB) at the Naval Postgraduate School (NPS) for approval. "The NPS IRB has jurisdiction over all human participant research that involves any form of social science research (experimentation or investigation) including research involving paper or on-line questionnaires, surveys, interviews, focus groups, etc." (IRB Research Guidelines, n.d.). The process included meeting the training requirements, as well as guidelines established by the IRB outlined in NPGSINST 3900.4.
- After receiving the approval from the IRB, the survey link was sent to the Dental Corps Community Manager (DCCM), who forwarded the link to Dental Corps Chief's office for inclusion in the Weekly Dental Update (WDU). The survey link was included and launched on 8 January 2010 and was distributed until 12 February 2010; however, it was not a Dental Corps driven initiative. The survey was open for participation until 15 February 2010.
- The results were downloaded for further analysis. In addition, the results were screened for accuracy and useful observations were considered for further investigation.
- The Oracle Crystal Ball Monte Carlo simulation software model was used to analyze this data.

Using Monte Carlo simulation, Oracle Crystal Ball automatically calculates and records the results of thousands of different "what if" cases. Analysis of these scenarios reveals to you the range of possible outcomes, their probability of occurring, the inputs that most impact your model, and where you should focus your efforts. (Oracle Crystal Ball, n.d.)

- The results were downloaded and analyzed to identify the best incentive program providing cost savings to the Navy based on the packages of greatest value for the sailors.

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IV. RESULTS AND ANALYSIS

A. SURVEY RESULTS

The survey titled, "Naval Dental Corps Non-Monetary Incentives Retention Survey" (NDCNMIRS), was open from 8 January 2010 to 15 February 2010. The target population was the Navy Dental Corps with active duty strength of 1,009 at the time the survey was distributed. The survey began with 120 Dental Corps (DC) officers, but only 89 completed the survey. The survey was distributed via the Weekly Dental Update from the DC Chief's office and was listed as "This survey is not a Dental Corps driven initiative." This could be a possible reason for a low response rate. The results were downloaded and analyzed to make recommendations based on the responses received from the DC officers. A list of questions and responses follows.

Question 1: I agree to participate in this survey.

Figure 4 shows that 120 respondents agreed to participate in the survey.

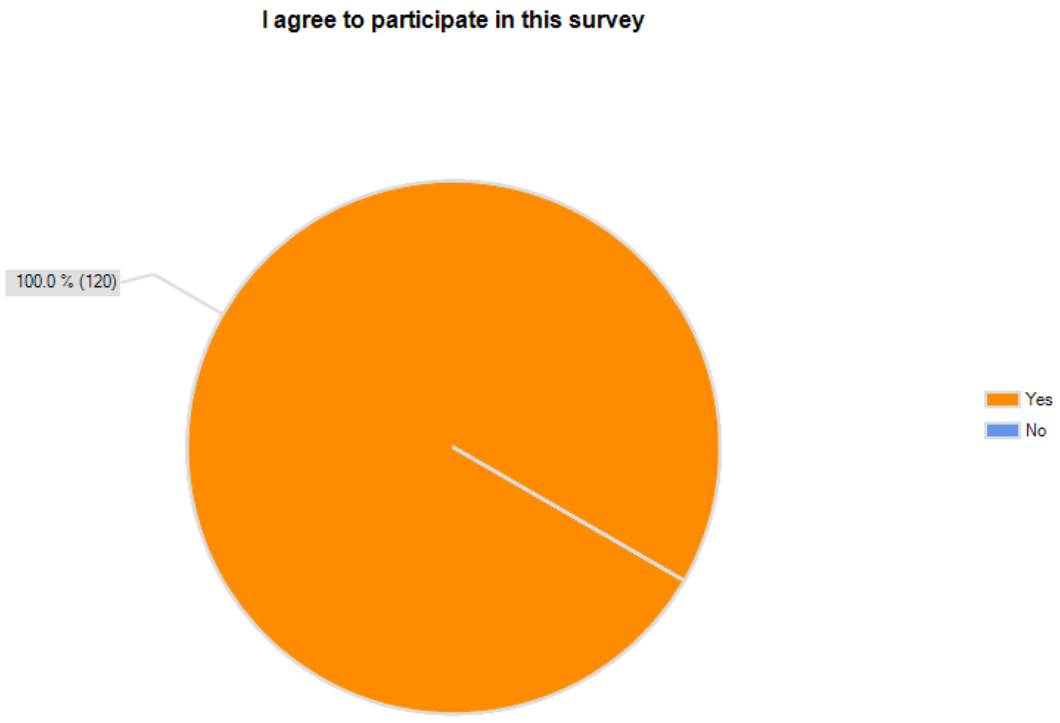

Figure 4. Participation Agreement (From: NDCNMIRS, SurveyMonkey)

Question 2: Gender

Figure 5 depicts 99 male and 21 female respondents.

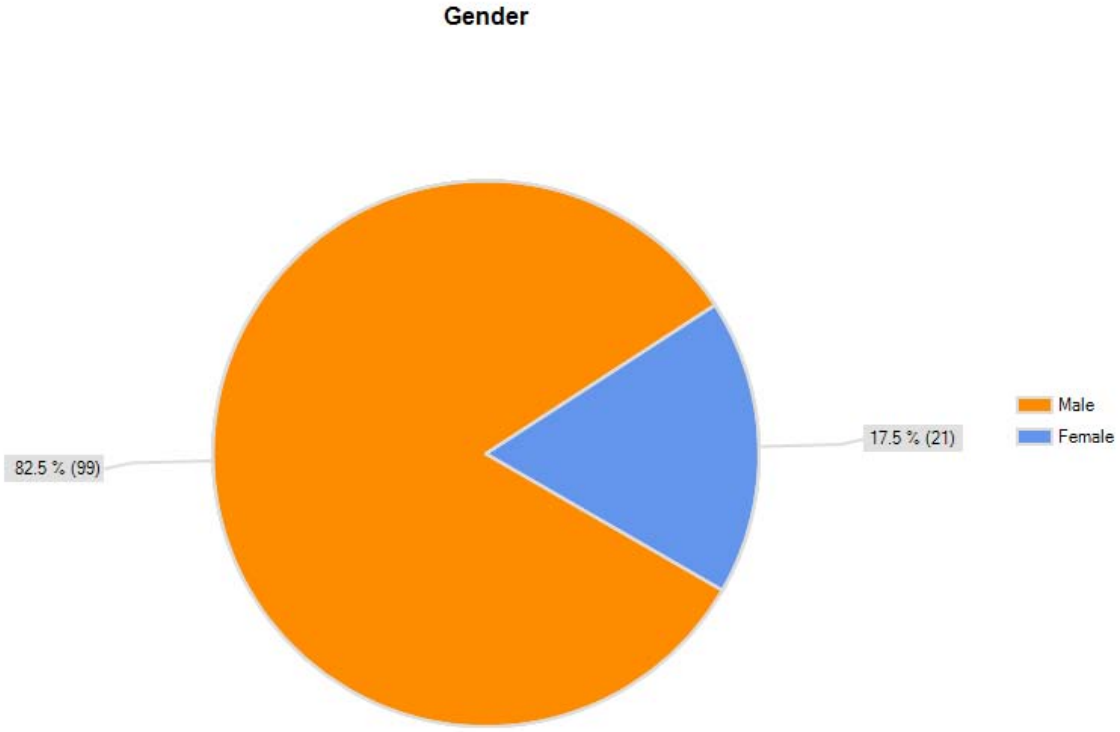

Figure 5. Gender (From: NDCNMIRS, SurveyMonkey)

The total number of male DC officers serving on active duty was 791 at the time the survey was distributed, which indicates that approximately 13 percent of all possible male respondents started the survey. On the other hand, out of 216 female DC officers serving on active duty, approximately 10 percent of all possible female respondents started the survey.

Question 3: Age

Figure 6 shows the age distribution for the 120 respondents. There were 23 respondents between the age of 21 and 30, representing 19 percent of survey respondents; 35 respondents between the age of 31 and 40, representing 29 percent of survey

respondents; 29 respondents between the age of 41 and 50, representing 24 percent of survey respondents; and 33 respondents for age 51 and above, representing 28 percent of survey respondents.

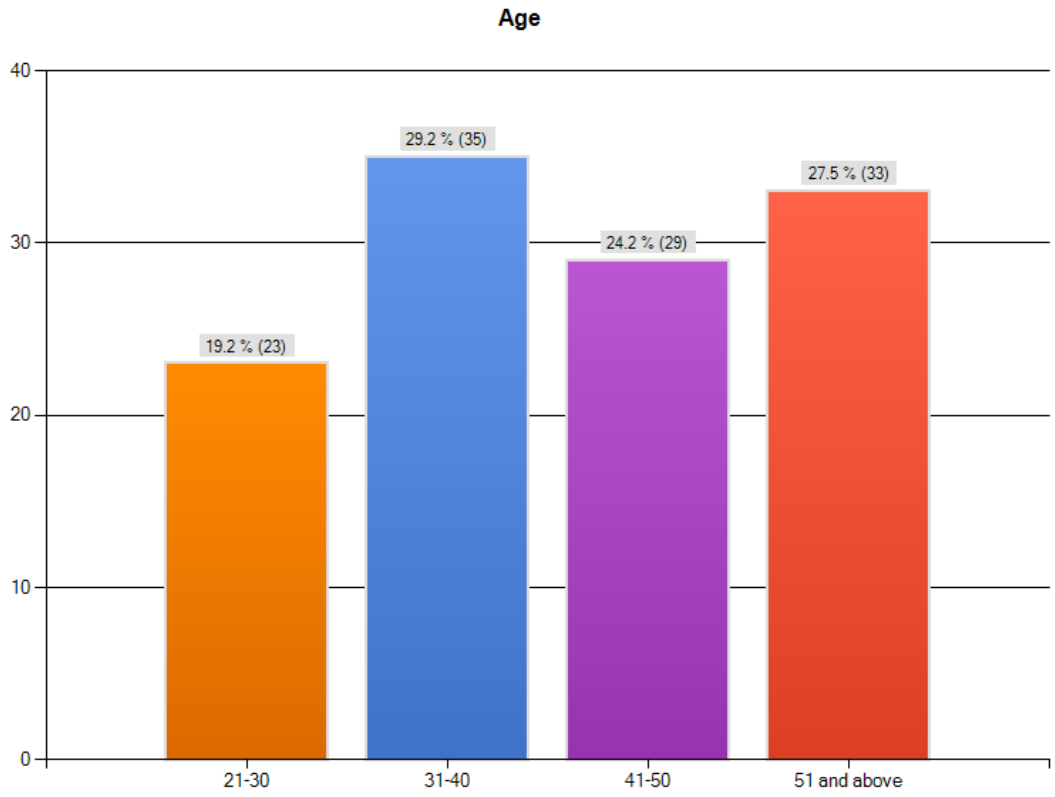

Figure 6. Age (From: NDCNMIRS, SurveyMonkey)

The results indicated that of the total respondents, the age group of 31–40 had the highest representation in the sample. The responses were uniformly distributed across the different age groups.

Question 4: Pay grade

Figure 7 shows 38 respondents were in the O-3 pay grade, three respondents in the O-3E pay grade, 18 respondents in the O-4 pay grade, 23 respondents in the O-5 pay grade, and 36 respondents in the O-6 pay grade. It also illustrates that pay grades O-3 and O-6 comprised the majority of responses received from the DC officers.

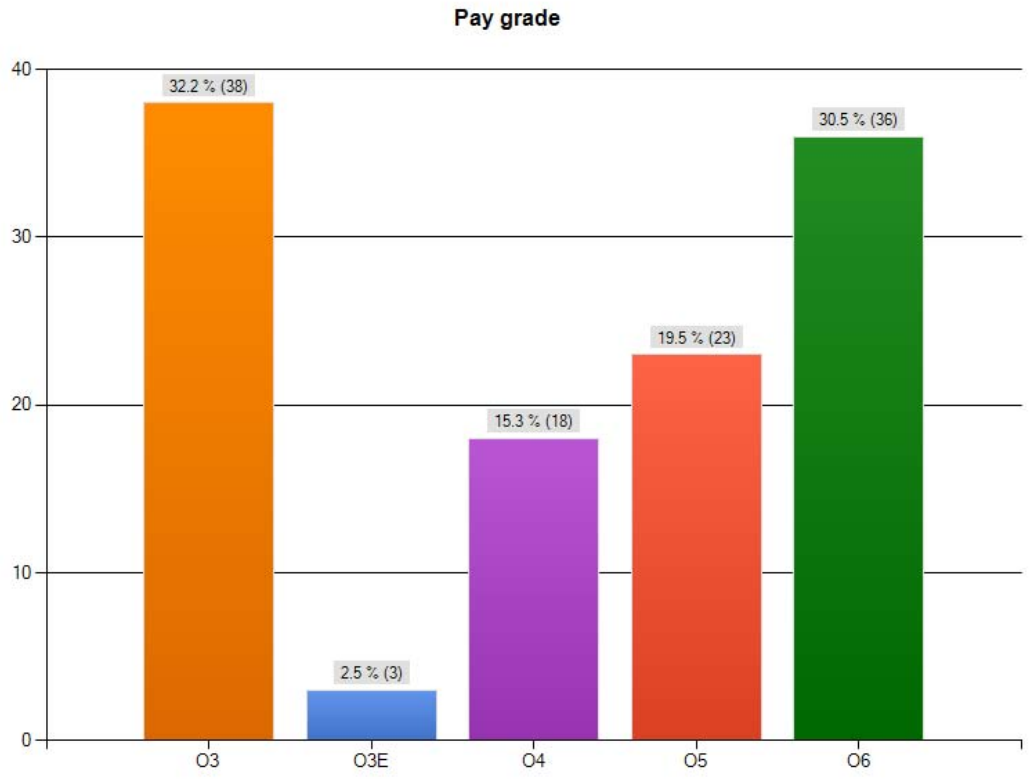

Figure 7. Pay Grade (From: NDCNMIRS, SurveyMonkey)

Table 5 indicates the total number of DC officers and number of respondents in each pay grade, and the respective percentages.

Table 5. Respondents Percentage of the DC Officers (After: Fiscal Year 2011 DC Lineal Listing; R. Gilliard, personal communication, February 17, 2010)

Pay Grade	Active Duty Strength	# of Respondents	Percent Responded
O-3	388	41	11%
O-4	181	18	10%
O-5	203	23	11%
O-6	237	36	15%
Total	**1009**	**118**	**12%**

Question 5: Years of active commissioned service completed

Figure 8 shows the years of active commissioned service for all respondents. There were 18 DC officers with 0–2 years of active commissioned service, 15 DC officers with 2 but less than 4, six DC officers with 4 but less than 5, four DC officers with more than 5 but less than 6, 15 DC officers with more than 6 but less than 10, three DC officers with 10 to 12, and 57 DC officers with more than 12 years of active commissioned service.

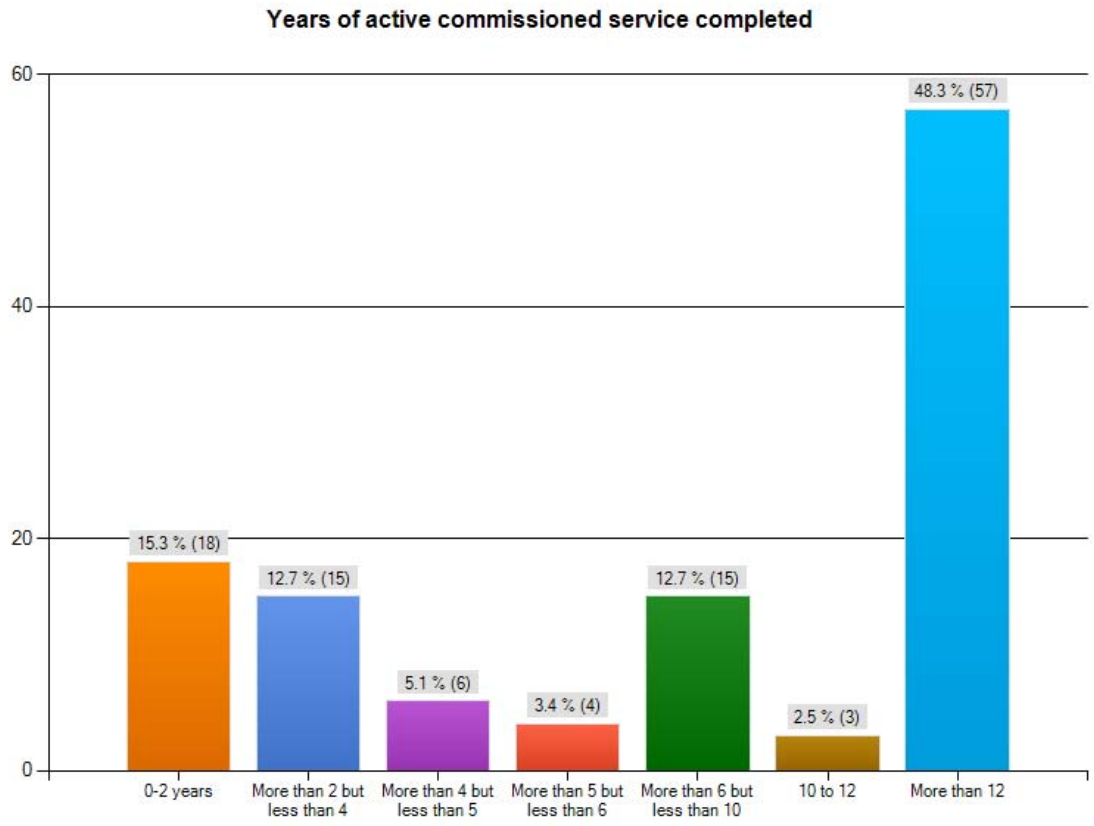

Figure 8. Years of Active Commissioned Service Completed (From: NDCNMIRS, SurveyMonkey)

The results signify that most DC officer respondents had more than 12 years of active commissioned service.

Question 6: Which dental school(s) did you graduate from?

One hundred fifteen DC officers responded with only 114 useful observations. Table 6 tabulates the results.

Question 7: What was your GPA?

One hundred eleven responses were collected with only 101 useful observations. Table 6 tabulates the results.

Table 6. Dental School Attended and GPA (After: NDCNMIRS, SurveyMonkey)

Respondent	Dental School	GPA
1	UCLA	3.85
2	TUDS - Temple University School of Dentistry	2.5
3	Ohio State University	3.3
4	University of Detroit	3.0
5	University of Mississippi / Indiana University	3.4 / 3.65
6	Boston University	3.0
7	Ohio State University	3.6
8	Louisiana State University	3.0
9	Case Western Reserve University	
10	University of Louisville, School of Dentistry	2.8
11	University of Louisville / University of Iowa	3.0
12	Loyola University Chicago	3.25
13	University of Texas Health Science Center San Antonio	3.01
14	Indiana University School of Dentistry	3.5
15	University of Iowa	3.0
16	Tufts	Pass/Fail
17	University at Buffalo	3.2
18	MARQUETTE	3.2
19	UOP	
20	University of Michigan	3.4
21	VCU	2.7
22	University of Mississippi	3.5
23	University of Kentucky College of Dentistry	3.6 approx.
24	UCSF	3.38
25	Loma Linda University	3.5
26	University of MD	3.8
27	University of Colorado	3.64
28	University of Pacific San Francisco / Naval Postgraduate Dental School	3.1 / 3.8

Respondent	Dental School	GPA
29	Howard University School of Dentistry	3.2
30	University of Michigan	3.2
31	UNLV School of Dental Medicine	3.56
32	Creighton Dental School	3.25
33	UNLV	
34	University of Detroit-Mercy	3.7
35	NEW YORK UNIVERSITY	3.27
36	The Ohio State University College of Dentistry / Naval Postgraduate Dental School	
37	The Ohio State University	3.47
38	UCSF School of Dentistry	3.85
39	University of Maryland Dental School	3.25
40	Medical College of Virginia (Virginia Commonwealth University)	3.3
41	Indiana Dental School	3.0
42	UTHSC San Antonio	3.6
43	University of CA, San Francisco	3.3
44	University of Minnesota	
45	University of Colorado	3.4
46	Boston University School of Goldman Dentistry	3.4
47	SUNY Buffalo	3.8
48	Temple University Maurice H. Kornberg School of Dentistry.	3.3
49	University of Michigan	3.85
50	Indiana University	3.75
51	Marquette	3.5
52	UMDNJ-NJDS	3.5
53	Louisiana State University	3.3
54	University of Iowa	3.5
55	Loma Linda University	2.9
56	University of the Pacific, San Francisco, California	3.5
57	Virginia Commonwealth University	
58	UCLA	Pass/Fail
59	University of Louisville School of Dentistry	3.4
60	University of Pittsburgh School of Dental Medicine	Pass/Fail
61	New York University	3.7
62	University of Mississippi / Indiana University	
63	University of Washington	3.4
64	NYU	2.8
65	Medical College of Georgia	3.1
66	West Virginia University School of Dentistry	Less than 3.0

Respondent	Dental School	GPA
67	UCSF	
68	Creighton	3.4 approx.
69	Case Western Reserve University	3.5 approx.
70	University of Louisville	
71	University of Nebraska Medical Center	3.2
72	Penn	3.2
73	Tennessee	2.8
74	University of Colorado / Naval Postgraduate Dental School	3.7 / 4.0
75	Meharry Medical College	3.12
76	New York University College of Dentistry	3.68
77	UTHSCSA	3.0
78	McGill University, Montreal, Canada	Pass/Fail
79	Nova Southeastern University	
80	UCSF	Pass/Fail
81	University of Detroit Mercy	2.85
82	Pittsburgh	3.2
83	SUNY at Buffalo	3.2
84	LSU	2.8
85	University of North Carolina / Univ. of Michigan	3.5 / 3.75
86	University of Pennsylvania School of Dental Medicine	3.8
87	University of Louisville / University of Iowa	2.9
88	VCU	3.64
89	University of Tennessee	3.3
90	Northwestern University	2.76
91	University of Illinois	2.75
92	Baylor College of Dentistry	
93	Indiana University Dental School	3.2
94	Tufts	3.0
95	Louisiana State University School of Dentistry	3.2
96	UC San Francisco	2.99
97	Baylor College of Dentistry	3.87
98	Pittsburgh	3.3
99	West Virginia University School of Dentistry	3.0
100	Medical College of Georgia	
101	SIU School of Dental Medicine	3.459
102	University of Louisville	3.2
103	University of Michigan	3.1
104	University of Maryland / UCLA School of Arts and Sciences	3.45 / 3.95
105	University of Texas Health Science Center at San Antonio	3.0
106	University of Kentucky College of Dentistry	

Respondent	Dental School	GPA
107	Boston University	3.6
108	UOP	2.7
109	U. Penn	3.5
110	University of Medicine and Dentistry of New Jersey	3.6
111	USC	3.6
112	Loyola (Chicago, Illinois)	3.2
113	Fairleigh Dickinson Dental School	3.2 approx.
114	University of Tennessee, Memphis, College of Dentistry	3.6 approx.

Of the total respondents who agreed to disclose their Grade Point Average (GPA) achieved in dental school, Table 6 shows that five respondents were on a Pass/Fail curriculum. The results indicate that the average GPA for all respondents was 3.32. Of the total respondents, nine DC officers were conferred two dental degrees. Additionally, the average male and female GPA was 3.31 and 3.3, respectively.

Question 8: What is your dental specialty?

One hundred fourteen DC officers responded to question 8 with only 110 useful observations. Table 7 lists the number of specialists in each specialty who responded to question 8.

Table 7. Number of Respondents in Each Dental Corps Specialty (After: NDCNMIRS, SurveyMonkey)

Specialty	Code	Number of Specialists
General Dentistry	1700	43
Endodontics	1710	2
General Dentistry ACP	1724	3
Comprehensive Dentistry	1725	20
Maxillofacial Prosthodontics	1730	1
Orthodontics	1735	2
Operative Dentistry	1740	4
Oral Diagnosis	1745	0
Exodontics	1749	3
Oral Surgery	1750	7
Periodontics	1760	7
Prosthodontics	1769	9
Public Health Dentistry	1775	0
Oral Pathology	1780	3

Specialty	Code	Number of Specialists
Orofacial Pain	1785	1
Dental Research	1790	0
Pediatric Dentistry	1795	5
	Total	**110**

Of the 110 DC officer respondents, the responses were fairly distributed across all the dental specialties.

Question 9: How much experience do you have in your specialty?

Figure 9 shows that 114 DC officers responded. Thirty-one respondents had less than two years of experience in their specialty, 13 respondents 2–3 years of experience, 12 respondents 4–6 years of experience, and 58 respondents more than six years of experience in their specialty.

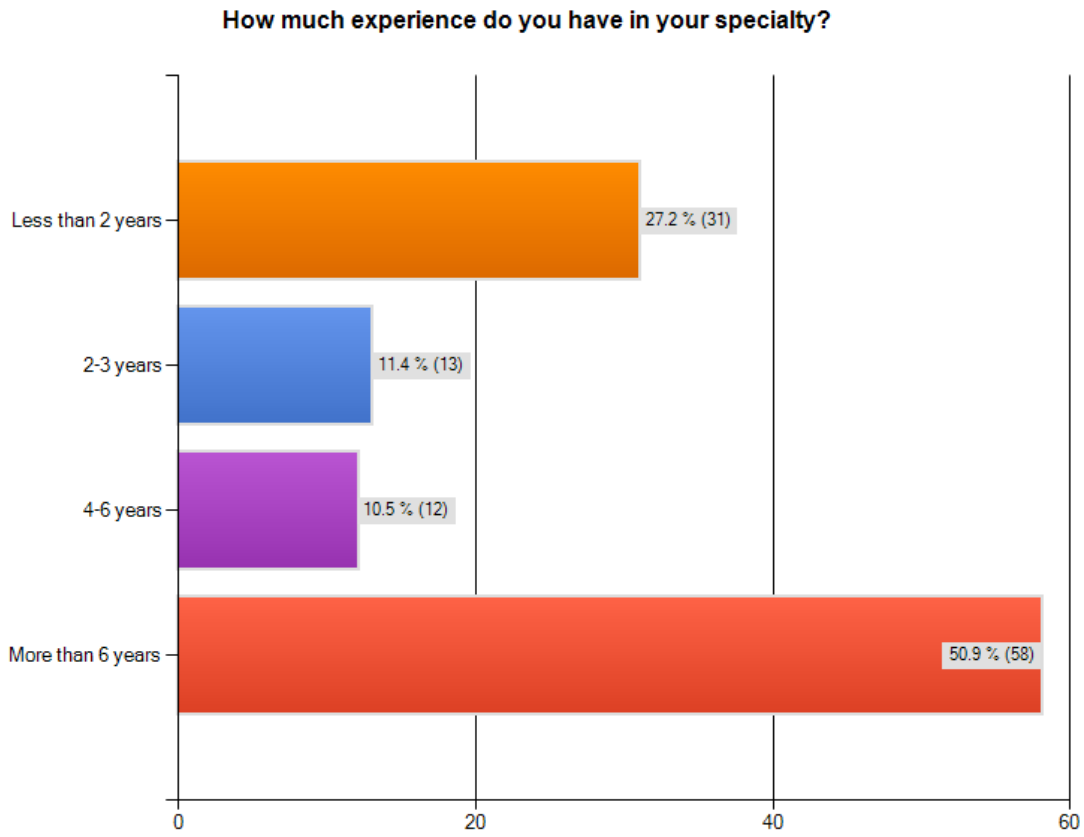

Figure 9. Experience in Specialty (From: NDCNMIRS, SurveyMonkey)

Question 10: List four dental specialties that you believe are most valuable to the Navy. Please rank in order (highest to lowest)

The DC officers provided 111 useful responses as to the number one most valuable dental specialty. Of the 111 responses, 54 DC officers listed Oral Surgery, 23 DC officers listed General Dentistry, and 19 DC officers listed Comprehensive Dentistry as the number one most valuable specialty to the Navy.

The DC officers gave 109 useful responses as to the number four most valuable dental specialty. Of the 109 responses, 31 DC officers listed Prosthodontics, 29 DC officers listed Periodontics, and 15 DC officers listed Endodontics as the number four most valuable specialty to the Navy.

Question 11: Prior Enlisted

One hundred fourteen DC officers responded. Figure 10 reflects the number of prior and non-prior enlisted. Only 14 DC officers were prior enlisted.

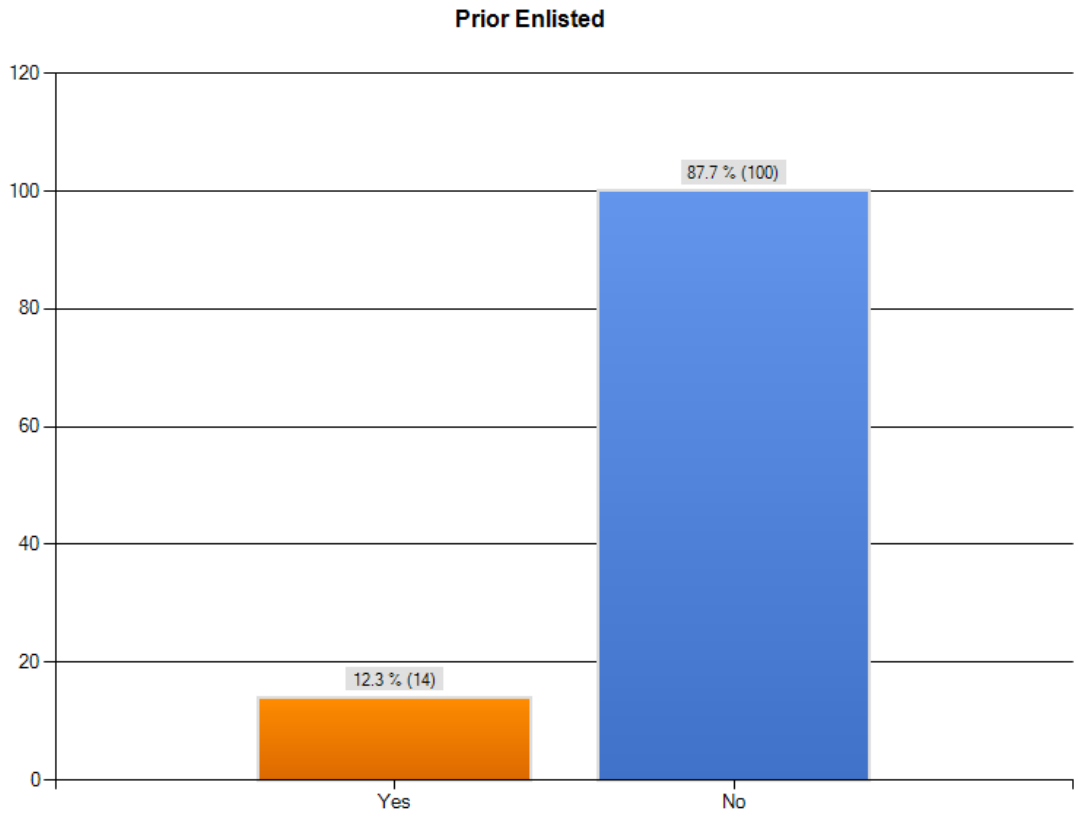

Figure 10. Prior Enlisted (From: NDCNMIRS, SurveyMonkey)

Question 12: Marital Status

There were 114 responses. Figure 11 reflects the marital status and the number in each category. The reported numbers in each category are as follows:

- 17 single, never married
- 78 married
- 13 married to a military member
- 6 divorced, separated, or widowed

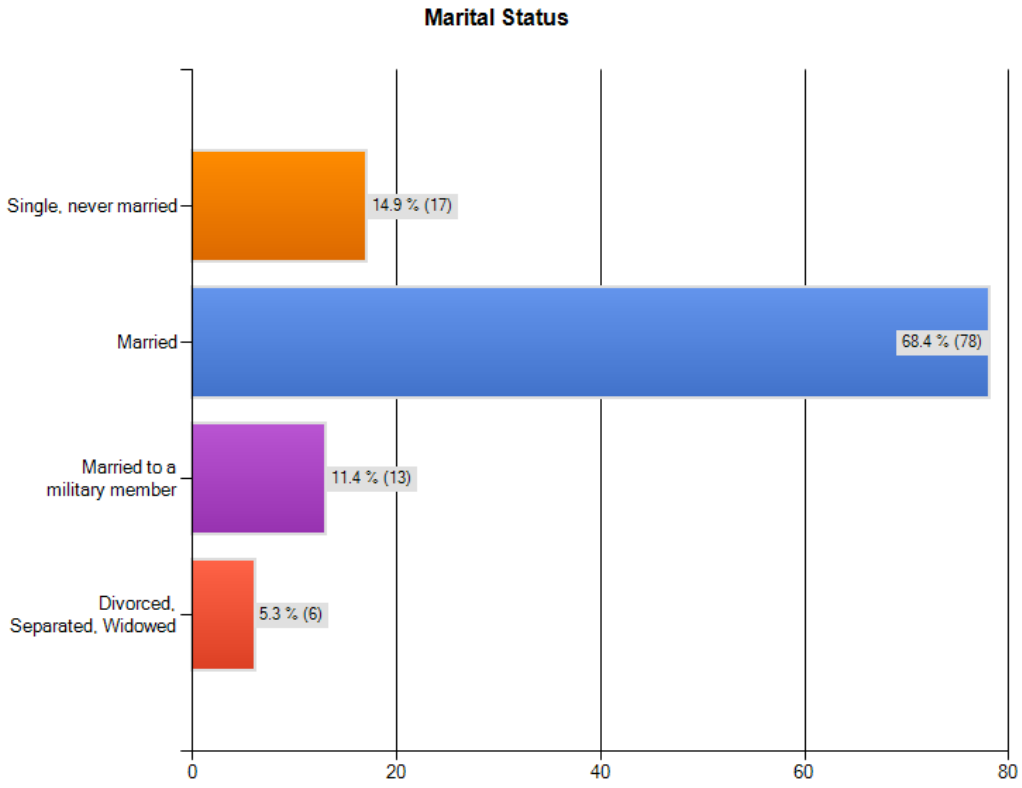

Figure 11. Marital Status (From: NDCNMIRS, SurveyMonkey)

Question 13: Number of dependents (not including spouse)

One hundred fourteen DC officers responded. Figure 12 shows the graphical representation. The results are listed below.

- 51 respondents have no dependents
- 14 respondents have one dependent
- 32 officers have two dependents

- 13 officers have three dependents
- Three officers have four dependents
- One officer has five or more dependents

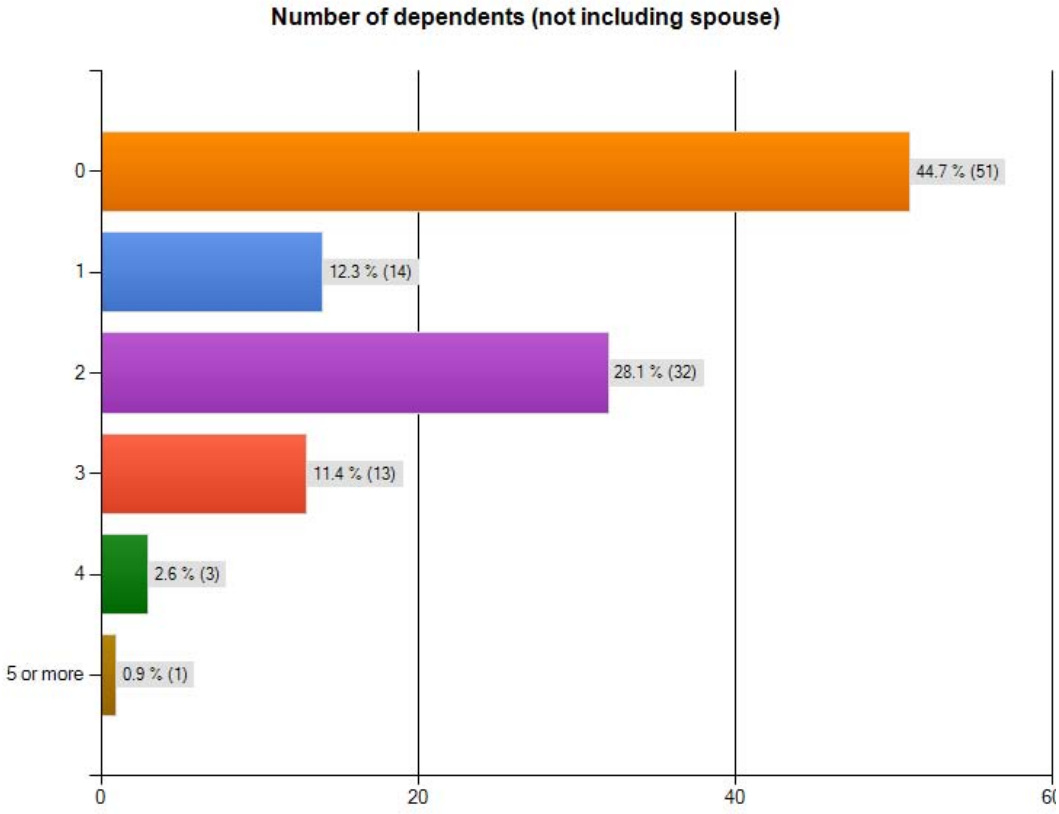

Figure 12. Number of Dependents (Not Including Spouse) (From: NDCNMIRS, SurveyMonkey)

Question 14: Current duty assignment

Survey results indicated 114 responses. Figure 13 presents the number of DC officers assigned to different duty locations. Eleven DC officers were assigned to a sea billet, 76 DC officers to a shore billet, 17 DC officers to overseas duty, and 10 DC officers were students.

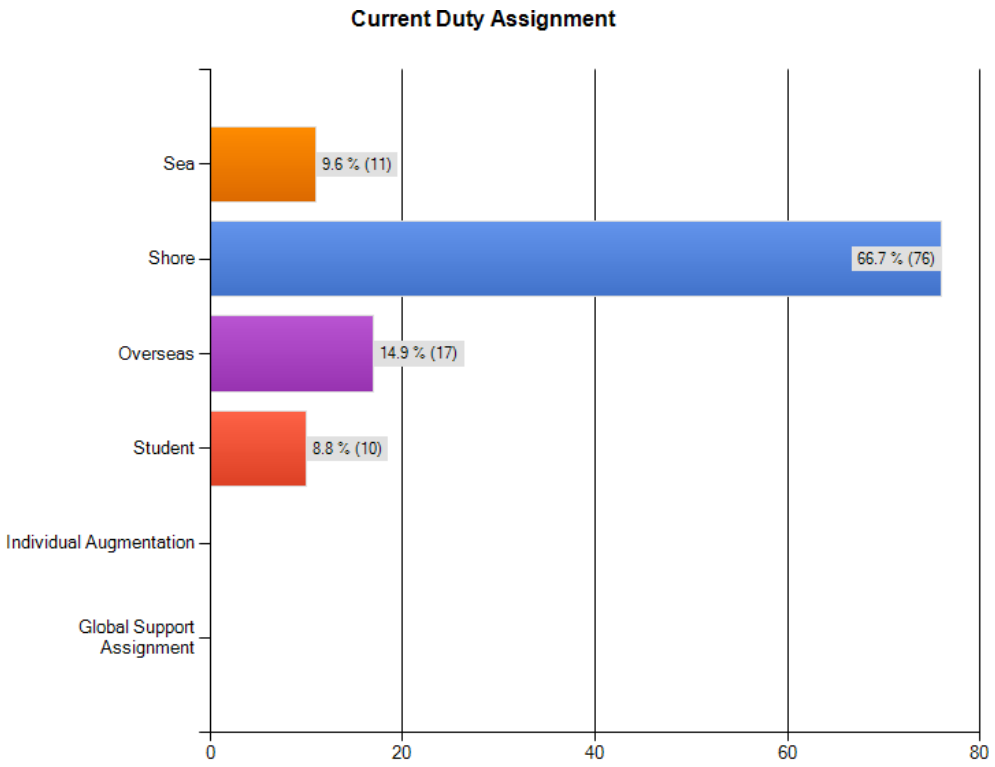

Figure 13. Current Duty Assignment (From: NDCNMIRS, SurveyMonkey)

The results did not reflect any responses from Individual Augments and Global Support Assignment personnel, which could be attributed to the distribution method used to disseminate the survey.

Question 15: In addition to your current assignment, are you assigned to a Platform (e.g., fleet hospital, Marine unit, etc.)?

One hundred thirteen DC officers responded. Figure 14 displays the results. Twenty DC officers were assigned to a platform, whereas 93 DC officers did not have an assigned platform.

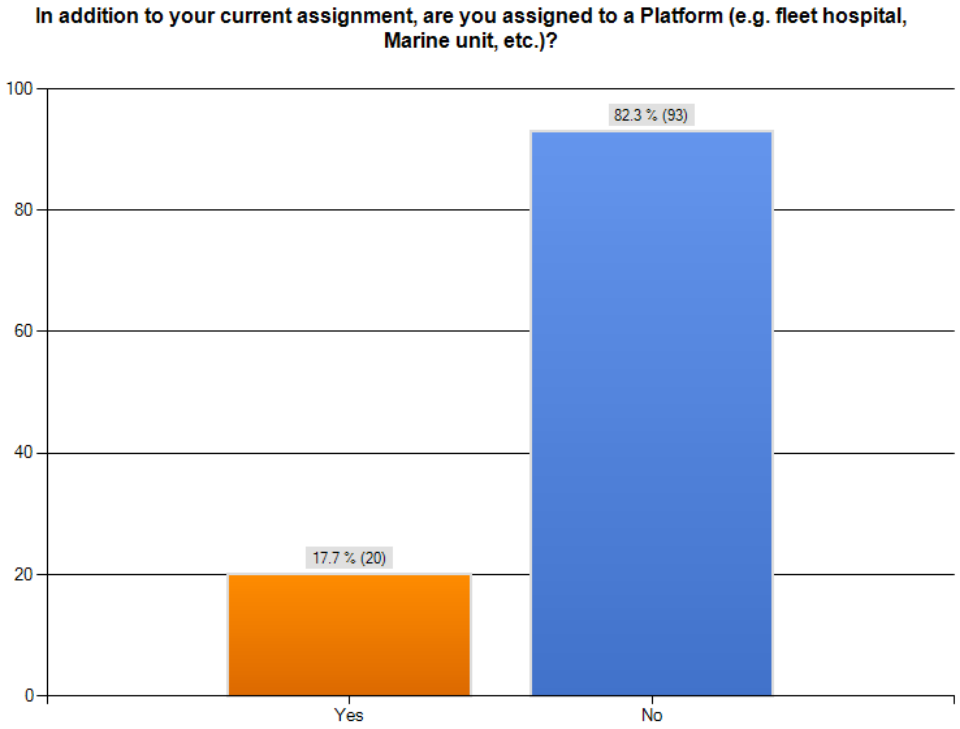

Figure 14. Platform Assignment (Yes/No) (From: NDCNMIRS, SurveyMonkey)

Question 16: If you answered 'Yes' to the previous question, please indicate the platform type:

Table 8 reflects the assigned platform type of the respondents.

Table 8. Platform Type of the DC Respondents (From: NDCNMIRS, SurveyMonkey)

Respondent	Platform
1	OHSU Portsmouth
2	Marine
3	FMF
4	NAS Jacksonville, FL
5	CRTS
6	Marine Expeditionary Unit
7	Overseas Sea Duty Ship
8	Marine Unit
9	3D Dental Battalion
10	Fleet Hospital 5
11	MARINE UNIT
12	fleet hospital
13	Marine unit

Respondent	Platform
14	Marine unit
15	FLEET HOSPITAL
16	Fleet Hospital
17	2d MLG
18	3D Dental Battalion
19	Fleet Hospital
20	NH Pensacola

Question 17: If given your choice of duty assignment, which one would be your first choice?

One thirteen responses were collected. Figure 15 shows that six DC officers preferred to have a sea duty assignment as their first choice, 57 DC officers a shore (CONUS) assignment, 41 DC officers a shore (OCONUS) assignment, and nine DC officers an operational assignment.

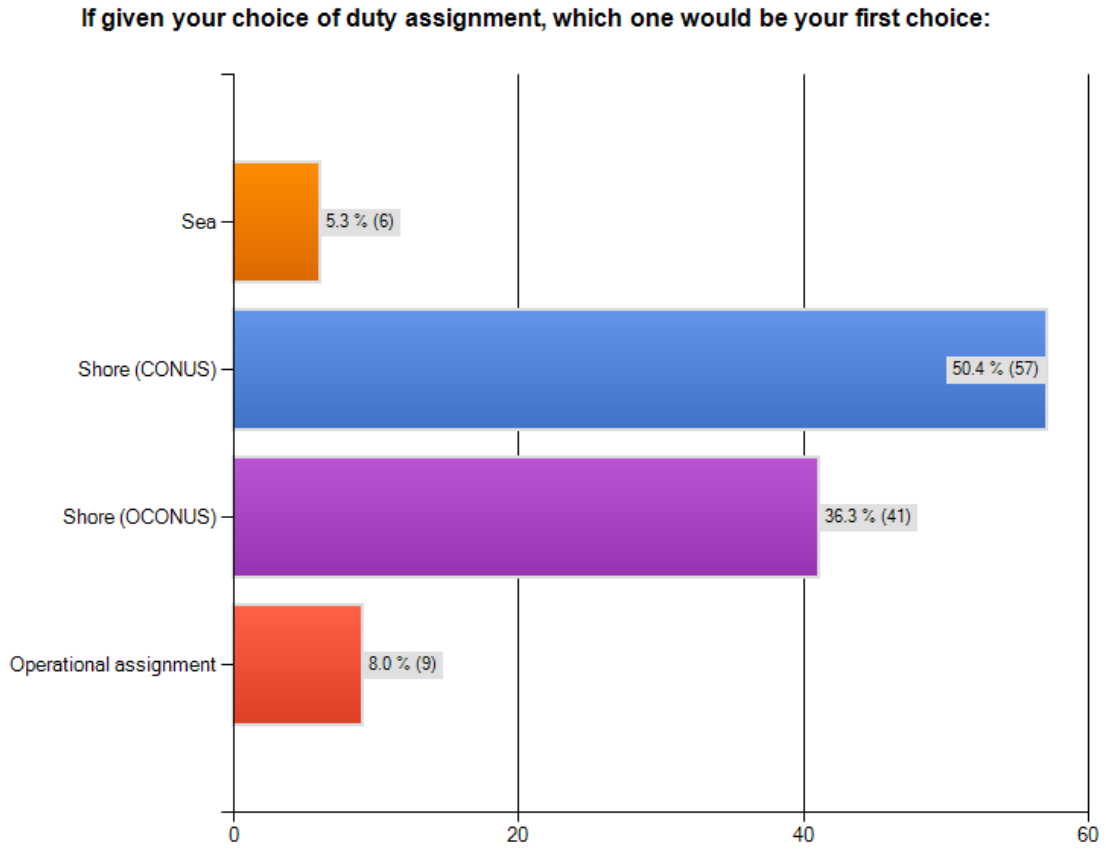

Figure 15. Duty Assignment Preferred (From: NDCNMIRS, SurveyMonkey)

The results also indicated that of the nine DC officers preferring an operational assignment, seven were senior officers in the O-5 and O-6 pay grades, whereas only two junior officers (O-3 and O-3E) preferred an operational assignment. Only one junior officer preferred sea duty as the first preference. Of the total officers who preferred a shore (CONUS) assignment, 35 senior officers were in the O-4 to O-6 pay grades, and 22 junior officers in the O-3 pay grade. Of the total officers who preferred a shore (OCONUS) assignment, 26 were in the O-4 to O-6 pay grades, and 15 junior officers in the O-3 and O-3E pay grades.

Question 18: Number of months deployed to a hostile area (Enter zero (0) if none)

There were 113 respondents. Figures 16 and 17 illustrate the results.

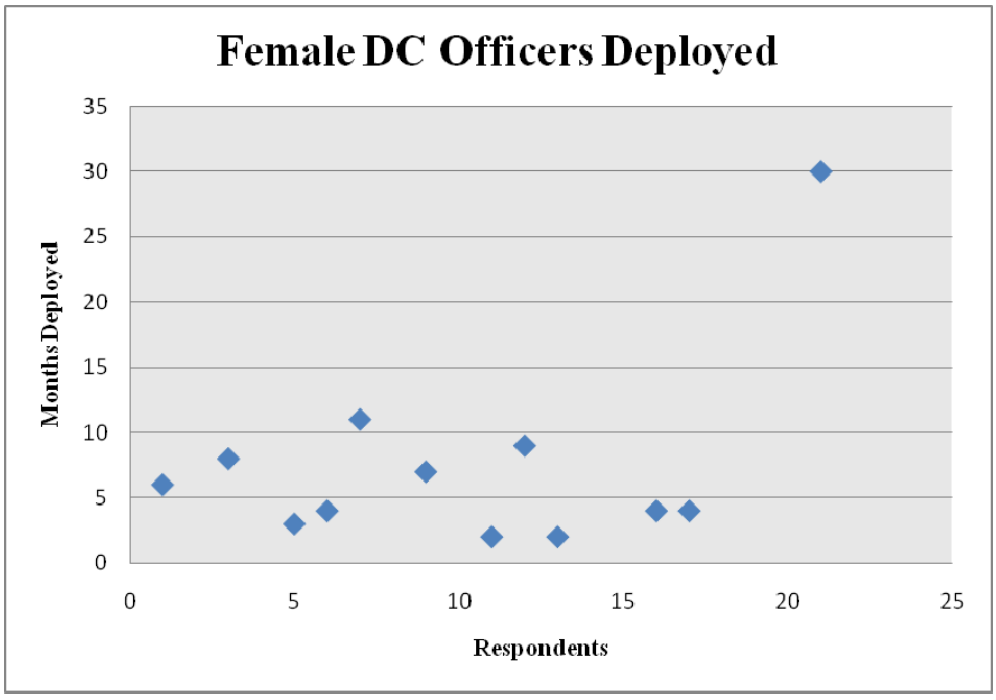

Figure 16. Female DC Officers Deployed (After: NDCNMIRS, SurveyMonkey)

Of the 113 DC officers, 12 female DC officers were deployed for between at least two months and up to a maximum of 30 months. Seven of the female DC officers had more than 12 years of active commissioned service. Of the 12 female DC officers, 10 were married officers, five married to a military member; one single, never married; and

one indicated a divorced, separated, widowed status. Three junior female DC officers were in the O-3 pay grade, whereas nine female DC officers were in the O-4 to O-6 pay grades. Of the 12 female DC officers who deployed, seven were General Dentists, three Comprehensive Dentists, one Prosthodontist, and one Operative Dentist.

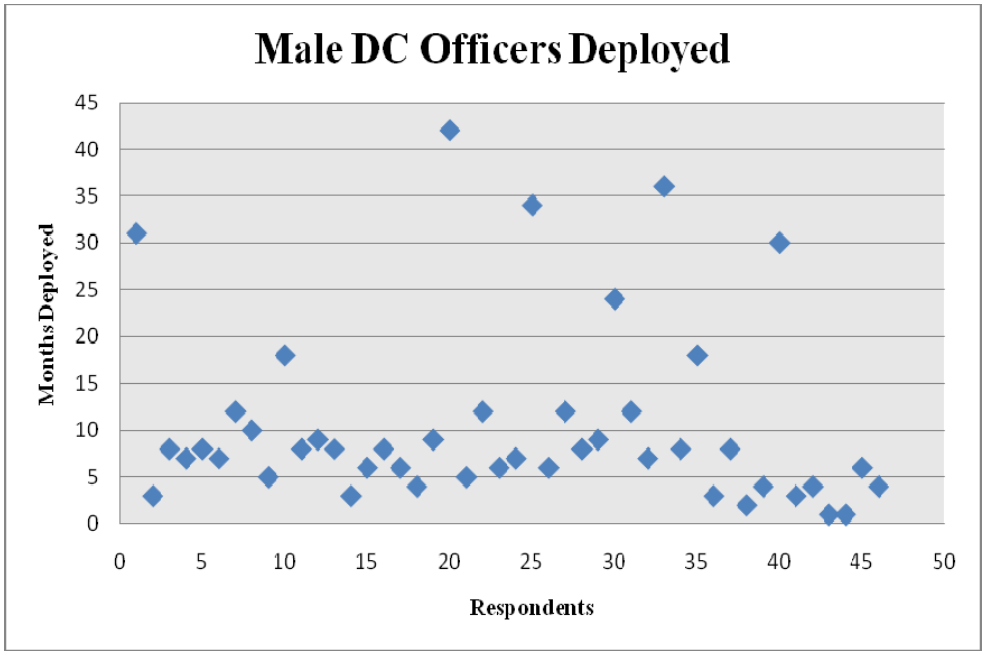

Figure 17. Male DC Officers Deployed (After: NDCNMIRS, SurveyMonkey)

The survey results showed that 46 male DC officers were deployed between 1 and 42 months. Of the 46 male DC officers who responded, only 18 officers had less than 12 years of active commissioned service and 28 officers had more than 12 years of active commissioned service. Of the 46 male DC officers, 36 were married officers, of which three were married to a military member; six were single, never married; and four indicated a divorced, separated, widowed status. Of the male DC officers who deployed, eight officers were in the O-3 and O-3E pay grades, whereas 39 officers were in the O-4 to O-6 pay grades. Of the 46 male DC officers who deployed, 16 were General Dentists, eight Comprehensive Dentists, one Endodontist, two Exodontists, three Operative Dentists, six Oral Surgeons, two Oral Pathologists, three Pediatric Dentists, two Periodontists, and three Prosthodontists.

The results reflect that approximately 51 percent of the DC officers who responded to the survey had been deployed for at least one month.

Question 19: Which of the following annual bonus(es)/special pay(s) do you receive? Check all that apply.

One hundred eleven responses were collected. Figure 18 shows the type of bonus/special pay and the number of DC officers who received these entitlements. Figure 18 also reflects that 104 DC officers received Additional Special Pay, 95 DC officers received Variable Special Pay, 35 DC officers received Board Certified Pay, eight DC officers received Incentive Special Pay, eight DC officers received Critical Skills Retention Bonus, and 44 DC officers received Dental Officer Multi-Year Retention Bonus.

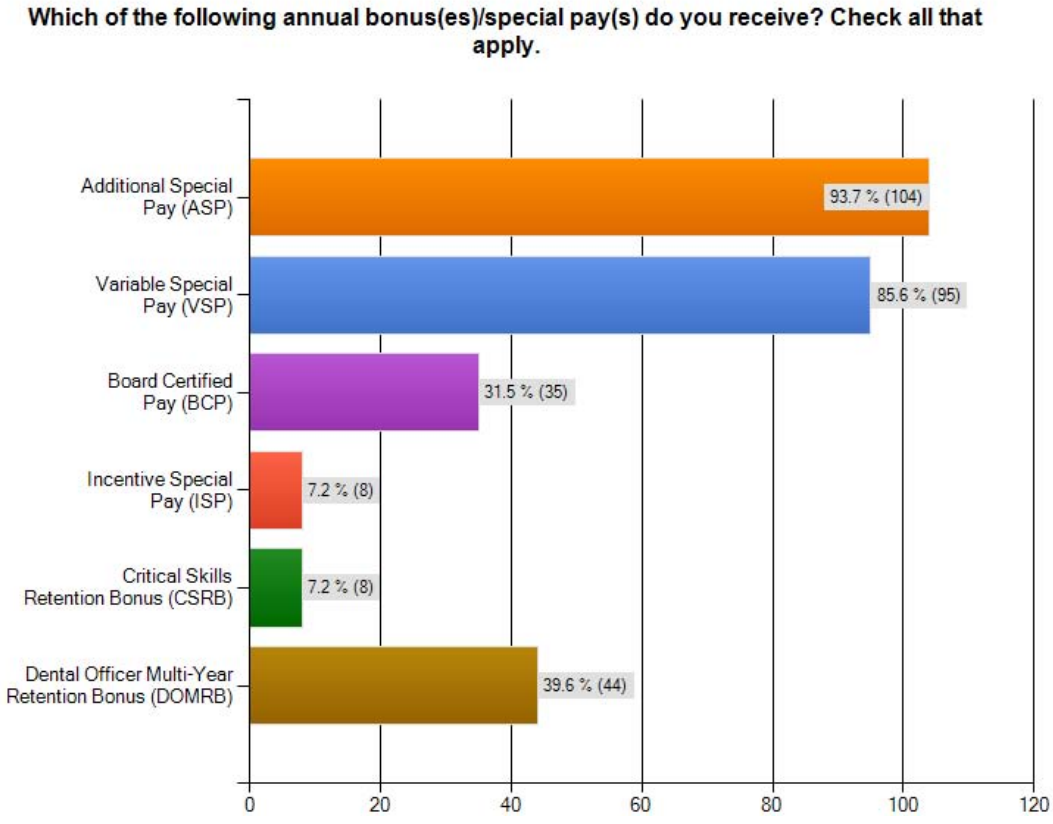

Figure 18. Annual Bonuses/Special Pays Received (From: NDCNMIRS, SurveyMonkey)

Question 20: What is the minimum amount of money (in dollars) you would require as a bonus payment (above and beyond your salary and other pays) to commit to four more years of active duty?

The options provided for question 20 were as follows.

- I would extend if no bonus were offered
- No amount of money would entice me to obligate more time
- To obligate for four years, I would require a minimum of $. Please specify the amount.

One hundred ten DC officers responded. Figure 19 shows the results. Ninety seven DC officer respondents required a bonus payment to obligate for four more years, eight DC officer respondents did not want to obligate for any amount of money, and five DC officer respondents would extend if no bonus were offered.

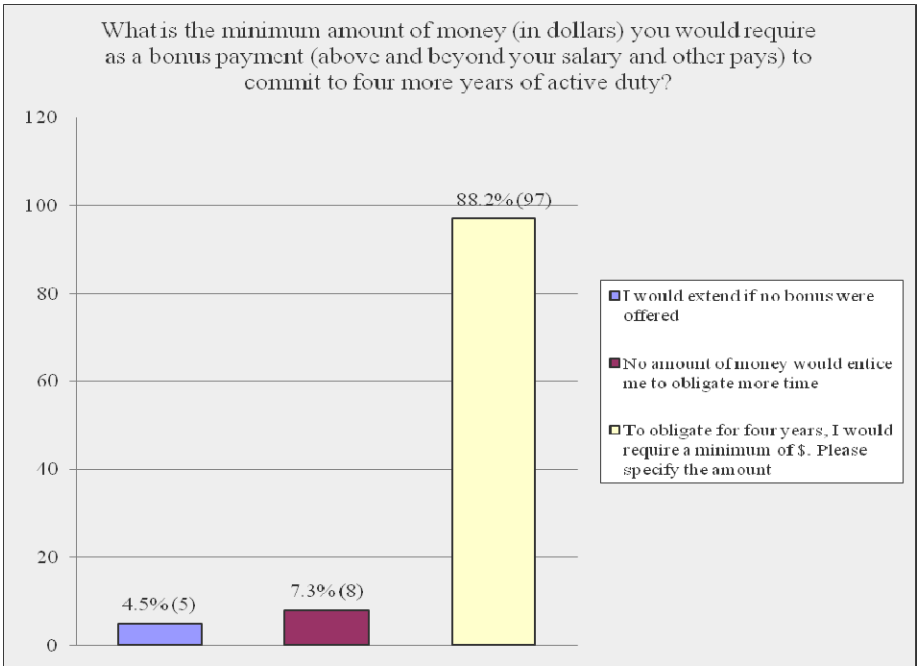

Figure 19. Minimum Amount Requirement to Obligate (After: NDCNMIRS, SurveyMonkey)

Table 9 reflects the obligation amount in dollars required by dental officers as a bonus payment to commit to four more years of active duty, as well as the special pays and bonuses received by the dental officers.

Table 9. Obligation Amount Required to Commit to Four More Years of Active Duty (After: NDCNMIRS, SurveyMonkey)

#	Gender	Pay Grade	Marital Status	Obligation Amount in Dollars	ASP	VSP	BCP	ISP	CSRB	DOMRB
1	Male	O-6	Married	$200,000			X		X	X
2	Male	O-6	Married	$300,000	X	X				X
3	Male	O5	Single, never married	$100,000	X	X				X
4	Male	O-3	Married	$80,000	X	X				
5	Male	O-4	Married	$400,000	X	X	X	X		
6	Male	O-6	Married	$50,000	X	X				
7	Male	O-6	Married	$200,000	X	X				X
8	Male	O-6	Married	$200,000	X	X	X			X
9	Male	O-6	Married	$100,000	X	X	X			X
10	Male	O-4	Married	$50,000	X	X	X			
11	Male	O-3	Married	$50,000	X	X				
12	Male	O-3	Married	$200,000	X	X				
13	Male	O-4	Married to a military member	$200,000				X		
14	Female	O-4	Married to a military member	$80,000	X	X				
15	Male	O-6	Married	$50,000	X	X	X			X
16	Female	O-3	Single, never married	$25,000	X					
17	Male	O-6	Married	$30,000	X	X				
18	Male	O-3	Married	$120,000	X	X	X			
19	Male	O-3	Married	$70,000	X	X				
20	Male	O5	Married	$50,000	X	X				X
21	Female	O-4	Married to a military member	$160,000	X	X			X	
22	Male	O-3	Married	$100,000	X	X				
23	Male	O-3	Married	$140,000	X	X				
24	Male	O-3E	Married	$100,000	X	X				
25	Male	O-4	Married	$300,000	X				X	X
26	Male	O-6	Divorced, Separated, Widowed	$400,000	X	X	X			X
27	Female	O-5	Divorced, Separated, Widowed	$360,000	X	X				

#	Gender	Pay Grade	Marital Status	Obligation Amount in Dollars	ASP	VSP	BCP	ISP	CSRB	DOMRB
28	Male	O-6	Married	$200,000	X	X	X			X
29	Female	O-6	Married	$75,000	X	X	X			X
30	Male	O-4	Married	$100,000	X	X				
31	Male	O-3	Married	$300,000	X	X				
32	Female	O-4	Married to a military member	$400,000	X	X				
33	Female	O-6	Married to a military member	$300,000	X	X				X
34	Male	O-6	Married	$50,000	X	X	X			
35	Female	O-3	Single, never married	$200,000	X	X			X	
36	Male	O-3	Single, never married	$1,000,000	X	X				
37	Male	O-3	Married to a military member	$200,000	X	X	X			
38	Male	O-3	Married	$2,000,000	X	X				
39	Male	O-5	Married	$200,000	X	X				X
40	Male	O-5	Divorced, Separated, Widowed	$100,000	X	X	X			X
41	Male	O-3	Married	$400,000	X	X				
42	Male	O-3	Married	$40,000	X	X				
43	Male	O-3	Married	$70,000	X	X				
44	Male	O-4	Married	$400,000	X	X				
45	Male	O-3	Married	$80,000	X					
46	Male	O-6	Married	$100,000	X	X	X	X		X
47	Male	O-4	Divorced, Separated, Widowed	$100,000	X	X				
48	Female	O-6	Married	$200,000	X	X	X			X
49	Male	O-5	Married	$75,000	X	X	X	X		X
50	Male	O-4	Married	$100,000	X	X				X
51	Male	O-6	Married	$80,000	X	X	X			
52	Male	O-3E	Married	$250,000	X	X				
53	Male	O-5	Married	$300,000		X	X	X		
54	Male	O-4	Married	$230,000	X	X				X
55	Male	O-6	Married	$50,000	X	X				X
56	Male	O-4	Married	$300,000	X	X	X			

#	Gender	Pay Grade	Marital Status	Obligation Amount in Dollars	ASP	VSP	BCP	ISP	CSRB	DOMRB
57	Female	O-3	Single, never married	$120,000	X	X				
58	Male	O-3	Divorced, Separated, Widowed	$200,000	X	X				
59	Male	O-4	Divorced, Separated, Widowed	$200,000	X	X	X			X
60	Female	O-3	Married	$50,000	X	X				
61	Male	O-3	Married	$20,000		X				
62	Male	O-3	Married	$500,000	X	X				
63	Male	O-3	Single, never married	$100,000	X					
64	Female	O-5	Married	$50,000	X	X	X			X
65	Male	O-6	Married	$50,000	X	X				X
66	Male	O-6	Married	$100,000	X	X	X	X	X	X
67	Male	O-3	Single, never married	$120,000	X	X	X			
68	Male	O-6	Married	$50,000	X	X				X
69	Male	O-6	Married	$200,000	X	X	X			X
70	Male	O-5	Single, never married	$280,000	X		X			X
71	Male	O-6	Married	$50,000	X	X				X
72	Male	O-4	Married	$120,000	X	X				
73	Female	O-4	Single, never married	$300,000	X	X	X			X
74	Male	O-5	Married	$80,000	X	X	X			X
75	Female	O-4	Married	$150,000						X
76	Male	O-3	Married	$80,000	X	X				
77	Male	O-6	Single, never married	$100,000	X	X				X
78	Male	O-4	Married	$75,000					X	
79	Male	O-5	Married	$300,000	X	X				
80	Male	O-6	Married to a military member	$200,000	X		X			X

#	Gender	Pay Grade	Marital Status	Obligation Amount in Dollars	ASP	VSP	BCP	ISP	CSRB	DOMRB
81	Female	O-6	Married to a military member	$50,000	X	X	X			
82	Male	O-5	Married	$200,000	X	X				
83	Female	O-6	Married	$2,000,000	X	X				X
84	Male	O-3	Single, never married	$80,000	X	X				
85	Male	O-3	Single, never married	$200,000	X	X				
86	Male	O-6	Married	$300,000	X	X	X			X
87	Male	O-3	Married	$400,000	X	X				
88	Male	O-5	Married	$40,000	X	X				X
89	Male	O-6	Married	$300,000	X	X		X	X	X
90	Male	O-5	Married	$200,000	X	X	X			X

Figure 20 graphically indicates the minimum bonus required to obligate for four more years of active duty.

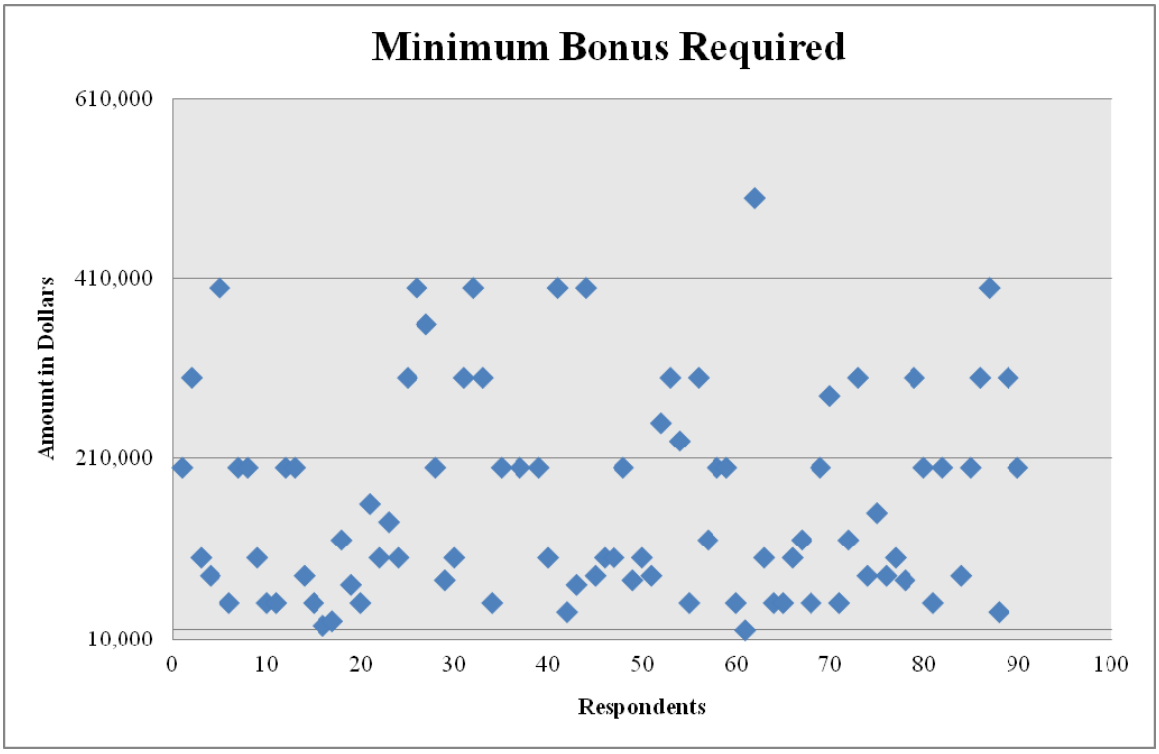

Figure 20. Minimum Bonus Required to Obligate (After: NDCNMIRS, SurveyMonkey)

The results in Table 9 reflects that 16 female DC officers required a bonus payment to commit to four more years of active duty and 74 male DC officers required a bonus payment to commit to four more years of active duty.

As per the results, of the 388 DC officers serving on active duty in the O-3 pay grade, 30 respondents, or eight percent, required a bonus payment to commit to four more years of active duty, whereas 60 respondents, or 10 percent, of the 621 DC officers serving on active duty in the O-4 to O-6 pay grades required a bonus payment to commit to four more years of active duty.

Forty-two DC officers required bonus payments of at least twenty-thousand dollars, up to a maximum of hundred thousand dollars, and 45 DC officers required bonus payments between one hundred and twenty thousand dollars to five hundred thousand dollars. Additionally, two DC officers required a minimum of two million dollars and one DC officer required a bonus payment of one million dollars to commit to four more years of active duty. These three values of bonus payments seemed unrealistic and indicated that these DC officers do not intend to continue active duty service.

Of the total DC officer respondents who required a bonus payment, 16 were Comprehensive Dentists; two Endodontists; two Exodontists; 34 General Dentists; one General Dentist (ACP); one dual-trained in Prosthodontics and Maxillofacial Prosthodontics; four Operative Dentists; three Oral Pathologists; seven Oral Surgeons; one Orofacial Pain Dentist; two Orthodontists; two Pediatric Dentists; one dual-trained in Pediatric Dentistry and Orthodontics; seven Periodontists; seven Prosthodontists.

The survey results signify 72 DC officers were married, of which eight were married to a military member; 12 indicated a single, never married status; and six indicated a divorced, separated, widowed status.

DC officers who responded received either a special pay or a bonus depending on their specialty, rank, years of service, etc. Of the 90 DC officers who responded, 84 received ASP, 80 DC officers received VSP, 31 DC officers received BCP, seven DC officers received ISP and CSRB, and 39 DC officers received DOMRB.

Question 21: Assuming the retention bonus you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following.

- Homesteading for two consecutive tours only (HS)
- Platform type of your choice only (PT)
- Full-time postgraduate training only (PG)
- Sabbatical only (SABB)

Table 10 reflects that 90 DC officers who responded to question 21. Additionally, it shows the obligation amount required, as well as the amount the DC officers were either willing to forego or not forego.

Table 10. Money Given Up to Receive Individual Non-Monetary Incentive (After: NDCNMIRS, SurveyMonkey)

		Money Given Up to Receive NMI			
Respondent	**Obligation Amount**	**HS**	**PT**	**PG**	**SABB**
1	$200,000	$0	$0	$50,000	$0
2	$300,000	$0	$0	$0	$200,000
3	$100,000	$25,000	$0	$0	$50,000
4	$80,000	$0	$0	$0	$0
5	$400,000	$0	$0	$0	$0
6	$50,000	$20,000	$10,000	$30,000	$20,000
7	$200,000	$0	$0	$0	$0
8	$200,000	$0	$0	$0	$0
9	$100,000	$0	$0	$0	$0
10	$50,000	$5,000	$5,000	$5,000	$25,000
11	$50,000	$10,000	$10,000	$20,000	$0
12	$200,000	$40,000	$20,000	$50,000	$0
13	$200,000	$1	$1	$0	$0
14	$80,000	$10	$0	$5	$10
15	$50,000	$0	$0	$0	$0
16	$25,000	$1,000	$1,000	$1,000	$1,000
17	$30,000	$0	$0	$0	$0
18	$120,000	$40,000	$10,000	$0	$0
19	$70,000	$0	$0	$30,000	$10,000
20	$50,000	$10,000	$0	$50	$25,000
21	$160,000	$0	$0	$10,000	$0
22	$100,000	$15,000	$5,000	$10,000	$20,000
23	$140,000	$15,000	$0	$35,000	$0
24	$100,000	$0	$0	$25,000	$0
25	$300,000	$0	$0	$0	$25,000
26	$400,000	$0	$0	$0	$0

		Money Given Up to Receive NMI			
Respondent	**Obligation Amount**	**HS**	**PT**	**PG**	**SABB**
27	$360,000	$0	$0	$10,000	$5,000
28	$200,000	$0	$10,000	$0	$0
29	$75,000	$0	$50,000	$0	$0
30	$100,000	$10,000	$10,000	$10,000	$10,000
31	$300,000	$20,000	$20,000	$50,000	$0
32	$400,000	$20,000	$20,000	$0	$20,000
33	$300,000	$100,000	$300,000	$0	$0
34	$50,000	$20,000	$20,000	$0	$10,000
35	$200,000	$20,000	$0	$50,000	$10,000
36	$1,000,000	$0	$0	$0	$0
37	$200,000	$80,000	$0	$120,000	$160,000
38	$2,000,000	$1	$1	$200,000	$1
39	$200,000	$0	$0	$0	$0
40	$100,000	$0	$0	$0	$25,000
41	$400,000	$0	$0	$0	$0
42	$40,000	$0	$0	$30,000	$0
43	$70,000	$0	$10,000	$0	$0
44	$400,000	$0	$0	$0	$0
45	$80,000	$30,000	$20,000	$0	$0
46	$100,000	$10,000	$0	$0	$0
47	$100,000	$0	$0	$0	$0
48	$200,000	$0	$0	$100,000	$100,000
49	$75,000	$0	$0	$0	$0
50	$100,000	$0	$0	$0	$0
51	$80,000	$25,000	$0	$0	$0
52	$250,000	$50,000	$50,000	$0	$100,000
53	$300,000	$50,000	$2,000	$0	$0
54	$230,000	$0	$0	$0	$0
55	$50,000	$0	$0	$0	$10,000
56	$300,000	$0	$0	$5,000	$5,000
57	$120,000	$15,000	$10,000	$30,000	$0
58	$200,000	$0	$0	$100,000	$0
59	$200,000	$0	$0	$0	$0
60	$50,000	$25,000	$0	$0	$0
61	$20,000	$10,000	$10,000	$10,000	$20,000
62	$500,000	$0	$0	$0	$0
63	$100,000	$0	$50,000	$50,000	$0
64	$50,000	$25,000	$0	$25,000	$50,000
65	$50,000	$0	$0	$0	$0
66	$100,000	$0	$0	$0	$0
67	$120,000	$60,000	$40,000	$60,000	$20,000
68	$50,000	$10,000	$0	$0	$0
69	$200,000	$0	$0	$0	$0
70	$280,000	$80,000	$0	$0	$0
71	$50,000	$0	$0	$0	$0

		Money Given Up to Receive NMI			
Respondent	**Obligation Amount**	**HS**	**PT**	**PG**	**SABB**
72	$120,000	$50,000	$0	$0	$50,000
73	$300,000	$0	$50,000	$0	$25,000
74	$80,000	$10,000	$0	$0	$0
75	$150,000	$0	$0	$0	$0
76	$80,000	$20,000	$10,000	$0	$15,000
77	$100,000	$20,000	$0	$0	$0
78	$75,000	$0	$0	$0	$0
79	$300,000	$0	$0	$0	$75,000
80	$200,000	$0	$0	$0	$0
81	$50,000	$0	$10,000	$0	$0
82	$200,000	$0	$0	$0	$0
83	$2,000,000	$0	$0	$0	$0
84	$80,000	$0	$0	$0	$0
85	$200,000	$0	$0	$0	$0
86	$300,000	$20,000	$0	$20,000	$20,000
87	$400,000	$100,000	$0	$0	$0
88	$40,000	$20,000	$10,000	$20,000	$20,000
89	$300,000	$150,000	$0	$100,000	$0
90	$200,000	$0	$0	$0	$100,000

Figure 21 indicates the average obligation amount required by the DC officers and the average amount DC officers were willing to forfeit to receive the individual non-monetary incentive. Additionally, n represents the number of useful responses, excluding the outliers, such as the one-dollar, ten-dollar, one-million dollar, and two-million dollar amounts.

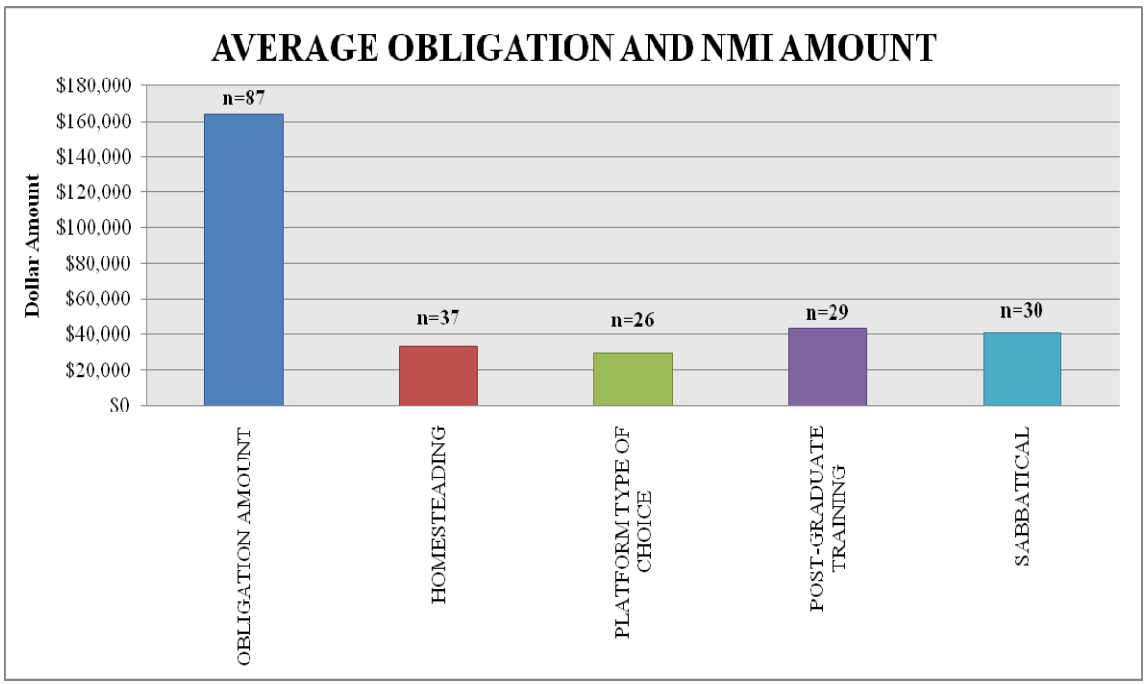

Figure 21. Average Obligation and NMI Amount (After: NDCNMIRS, SurveyMonkey)

The number of DC officers and the dollar amount ranges as illustrated in Table 6 are as follows.

- Forty DC officers were willing to give up in the range of one dollar to one hundred fifty thousand dollars for homesteading for two consecutive tours only.
- Twenty DC officers were willing to give up in the range of one dollar to three hundred thousand dollars for platform type of choice only.
- Thirty-one DC officers were willing to give up in the range of five dollars to two hundred thousand dollars for full-time postgraduate training only.
- Thirty-two DC officers were willing to give up in the range of one dollar to two hundred thousand dollars for sabbatical only.

Of the 90 DC officers who responded, 61 DC officers were willing to give up money to receive non-monetary incentives. Twenty-nine DC officers were not willing to forego any bonus payment; 24 DC officers were willing to give up portion of bonus payment for one of the four options provided; 14 DC officers were willing to forfeit a portion of bonus payment for two of the four options provided; 14 DC officers were

willing to relinquish portion of bonus payment for three of the four options provided; and nine DC officers were willing to decline a portion of bonus payment for all the four options provided.

It is also important to note that only approximately one-third of the respondents expressed any positive value for platform choice, postgraduate training or sabbatical; only 40 out of 90 expressed any positive value for geographic stability. At the same time, some DC officers valued each of these non-monetary incentives very highly.

The results showed that of the 61 DC officers, 14 female and 47 male DC officers were willing to give up money to receive non-monetary incentives. Twenty-four DC officers were in the O-3 and O-3E pay grades, whereas 37 DC officers were in the O-4 to O-6 pay grades. Forty-nine DC officers were married; nine indicated a single, never married status; and three indicated a divorced, separated, widowed status.

Of the 61 DC officers willing to forego money for one NMI, there were 12 Comprehensive Dentists, one Endodontist, one Exodontist, 26 General Dentists, two Operative Dentists, two Oral Pathologists, four Oral Surgeons, one Orofacial Pain Dentist, one Orthodontist, one Pediatric Dentist, five Periodontists, and five Prosthodontists.

Question 22: Assuming the retention bonus you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following combinations of incentives.

- Homesteading for two consecutive tours and platform type of your choice (HS_PT)
- Homesteading for two consecutive tours and full-time postgraduate training (HS_PG)
- Homesteading for two consecutive tours and sabbatical (HS_SABB)
- Platform type of your choice and full-time postgraduate training (PT_PG)
- Platform type of your choice and sabbatical (PT_SABB)
- Full-time postgraduate training and sabbatical (PG_SABB)

Table 11 reflects that 90 DC officers responded to question 22. Additionally, it indicates the obligation amount required, as well as the amount the DC officers were either willing to forego or not forego.

Table 11. Money to Give Up to Receive Combinations of Two Non-Monetary Incentives (After: NDCNMIRS, SurveyMonkey)

#	Obligation Amount	HS_PT	HS_PG	HS_SABB	PT_PG	PT_SABB	PG_SABB
1	$200,000	$0	$0	$0	$0	$0	$0
2	$300,000	$0	$0	$0	$0	$0	$0
3	$100,000	$1	$1	$75,000	$1	$1	$1
4	$80,000	$0	$5,000	$0	$0	$0	$0
5	$400,000	$0	$0	$0	$0	$0	$0
6	$50,000	$0	$0	$0	$0	$0	$0
7	$200,000	$0	$0	$0	$0	$0	$0
8	$200,000	$0	$0	$0	$0	$0	$0
9	$100,000	$0	$0	$0	$0	$0	$0
10	$50,000	$0	$0	$0	$0	$0	$0
11	$50,000	$10,000	$40,000	$10,000	$20,000	$0	$20,000
12	$200,000	$60,000	$90,000	$40,000	$70,000	$20,000	$50,000
13	$200,000	$0	$0	$0	$0	$0	$0
14	$80,000	$0	$0	$0	$0	$0	$0
15	$50,000	$0	$0	$0	$0	$0	$0
16	$25,000	$5,000	$5,000	$5,000	$5,000	$5,000	$5,000
17	$30,000	$0	$0	$0	$0	$0	$0
18	$120,000	$50,000	$0	$0	$0	$0	$0
19	$70,000	$0	$0	$0	$30,000	$10,000	$10,000
20	$50,000	$0	$0	$0	$0	$0	$0
21	$160,000	$0	$20,000	$20,000	$0	$0	$20,000
22	$100,000	$10,000	$12,000	$10,000	$5,000	$5,000	$10,000
23	$140,000	$15,000	$35,000	$15,000	$35,000	$0	$35,000
24	$100,000	$0	$50,000	$0	$50,000	$0	$0
25	$300,000	$10,000	$25,000	$50,000	$50,000	$50,000	$50,000
26	$400,000	$50,000	$0	$0	$0	$0	$0
27	$360,000	$5,000	$10,000	$0	$0	$0	$0
28	$200,000	$10,000	$0	$0	$0	$0	$0
29	$75,000	$50,000	$0	$0	$0	$50,000	$0
30	$100,000	$30,000	$20,000	$30,000	$10,000	$20,000	$20,000
31	$300,000	$20,000	$50,000	$20,000	$50,000	$20,000	$50,000
32	$400,000	$0	$0	$0	$0	$0	$0
33	$300,000	$0	$0	$0	$0	$0	$0
34	$50,000	$20,000	$0	$30,000	$0	$0	$0
35	$200,000	$20,000	$20,000	$20,000	$50,000	$20,000	$50,000
36	$1,000,000	$0	$0	$0	$0	$0	$0

#	Obligation Amount	HS_PT	HS_PG	HS_SABB	PT_PG	PT_SABB	PG_SABB
37	$200,000	$0	$0	$0	$0	$0	$0
38	$2,000,000	$1	$200,000	$1	$200,000	$1	$200,000
39	$200,000	$0	$0	$0	$0	$0	$0
40	$100,000	$0	$0	$0	$0	$0	$0
41	$400,000	$1	$1	$1	$1	$1	$1
42	$40,000	$0	$30,000	$0	$30,000	$0	$30,000
43	$70,000	$0	$10,000	$0	$10,000	$0	$0
44	$400,000	$0	$0	$0	$0	$0	$0
45	$80,000	$40,000	$20,000	$40,000	$10,000	$10,000	$0
46	$100,000	$0	$0	$0	$0	$0	$0
47	$100,000	$0	$0	$0	$0	$0	$0
48	$200,000	$0	$0	$0	$0	$0	$0
49	$75,000	$0	$0		$0	$0	$0
50	$100,000	$0	$0	$0	$0	$0	$0
51	$80,000	$0	$0	$0	$0	$0	$0
52	$250,000	$100,000	$1	$150,000	$1	$50,000	$1
53	$300,000	$0	$0	$0	$0	$0	$0
54	$230,000	$0	$0	$0	$0	$0	$0
55	$50,000	$0	$0	$0	$0	$0	$0
56	$300,000	$0	$0	$5,000	$5,000	$0	$25,000
57	$120,000	$20,000	$30,000	$20,000	$30,000	$15,000	$30,000
58	$200,000	$0	$150,000	$0	$100,000	$0	$150,000
59	$200,000	$0	$0	$0	$0	$0	$0
60	$50,000	$25,000	$25,000	$25,000	$10,000	$10,000	$15,000
61	$20,000	$15,000	$15,000	$15,000	$15,000	$15,000	$15,000
62	$500,000	$0	$0	$0	$0	$0	$0
63	$100,000	$0	$0	$0	$0	$0	$0
64	$50,000	$1,000	$1,000	$1,000	$5,000	$5,000	$5,000
65	$50,000	$0	$0	$0	$0	$0	$0
66	$100,000	$0	$0	$0	$0	$0	$0
67	$120,000	$60,000	$120,000	$80,000	$60,000	$40,000	$60,000
68	$50,000	$0	$0	$0	$0	$0	$0
69	$200,000	$0	$0	$0	$0	$0	$0
70	$280,000	$80,000	$80,000	$80,000	$0	$0	$0
71	$50,000	$0	$0	$0	$0	$0	$0
72	$120,000	$50,000	$1	$60,000	$1	$50,000	$1
73	$300,000	$0	$0	$0	$0	$0	$0
74	$80,000	$10,000	$0	$0	$0	$0	$0
75	$150,000	$0	$0	$0	$0	$0	$0
76	$80,000	$30,000	$0	$40,000	$0	$15,000	$0
77	$100,000	$20,000	$20,000	$20,000	$0	$0	$0
78	$75,000	$0	$0	$0	$0	$0	$0
79	$300,000	$0	$0	$75,000	$0	$0	$0
80	$200,000	$0	$0	$0	$0	$0	$0

#	Obligation Amount	HS_PT	HS_PG	HS_SABB	PT_PG	PT_SABB	PG_SABB
81	$50,000	$0	$0	$0	$0	$0	$0
82	$200,000	$0	$0	$0	$0	$0	$0
83	$2,000,000	$10	$10	$10	$10	$10	$1,000,000
84	$80,000	$0	$0	$0	$0	$0	$0
85	$200,000	$0	$0	$0	$0	$0	$0
86	$300,000	$20,000	$25,000	$25,000	$20,000	$5,000	$20,000
87	$400,000	$100,000	$0	$0	$0	$0	$0
88	$40,000	$20,000	$30,000	$20,000	$20,000	$20,000	$20,000
89	$300,000	$0	$0	$0	$0	$0	$0
90	$200,000	$0	$0	$0	$0	$0	$0

Figure 22 indicates the average obligation amount required by the DC officers and the average amount DC officers were willing to forfeit to receive the combinations of two non-monetary incentives. Additionally, n represents the number of useful responses, excluding the outliers, such as the one-dollar, ten-dollar, and one-million dollar amounts.

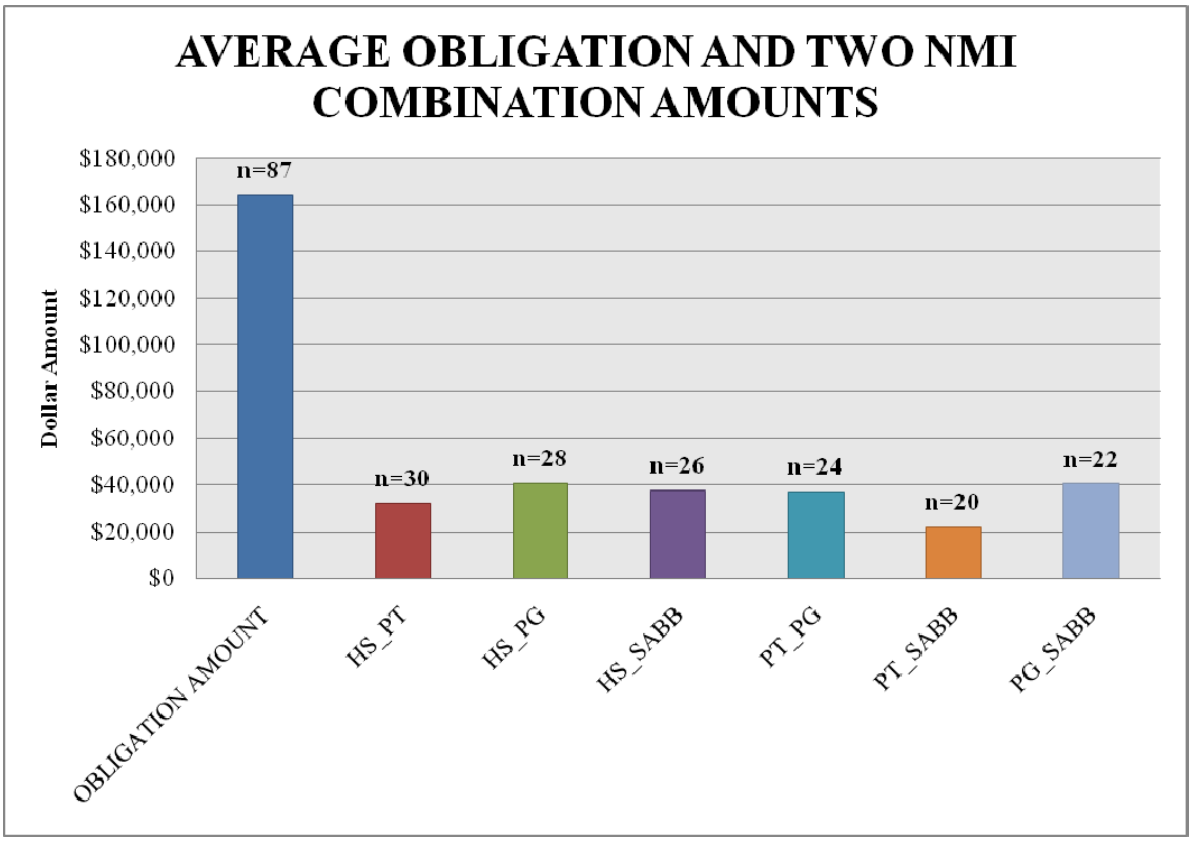

Figure 22. Average Obligation and Two NMI Combination Amounts (After: NDCNMIRS, SurveyMonkey)

The number of DC officers and the dollar amount ranges as illustrated in Table 7 are as follows.

- Thirty-four DC officers were willing to give up in the range of one dollar to one hundred thousand dollars for homesteading for two consecutive tours and platform type of choice only.
- Thirty-two DC officers were willing to give up in the range of one dollar to two hundred thousand dollars for homesteading for two consecutive tours and full-time postgraduate training only.
- Thirty DC officers were willing to give up in the range of one dollar to one hundred fifty thousand dollars for homesteading for two consecutive tours and sabbatical only.
- Twenty-nine DC officers were willing to give up in the range of one dollar to two hundred thousand dollars for platform type of choice and full-time postgraduate training only.
- Twenty-four DC officers were willing to give up in the range of one dollar to fifty thousand dollars for platform type of choice and sabbatical only.
- Twenty-seven DC officers were willing to give up in the range of one dollar to one million dollars for full-time postgraduate training and sabbatical only.

Of the 90 DC officers who responded, 43 DC officers were willing to give up money to receive non-monetary incentives. Forty-seven DC officers were not willing to forego any bonus payment; seven DC officers were willing to forfeit portion of bonus payment for one of the six options provided; five DC officers were willing to relinquish portion of bonus payment for two of the six options provided; eight DC officers were willing to give up a portion of bonus payment for three of the six options provided; none of the DC officers are willing to decline a portion of bonus payment for four of the six options provided; three DC officers were willing to cede portion of bonus payment for five of the six options provided; and 20 DC officers were willing to yield a portion of bonus payment for all six options provided.

The results showed that of the 43 DC officers, nine female and 34 male DC officers were willing to give up money to receive non-monetary incentives. Twenty-four DC officers were in the O-3 and O-3E pay grades, whereas 19 DC officers were in the O-4 to O-6 pay grades. Thirty-three DC officers were married; seven indicated a single, never married status; and three indicated a divorced, separated, widowed status.

Of the 43 DC officers willing to forego money, there were six Comprehensive Dentists, one Endodontist, one Exodontist, 24 General Dentists, one Oral Pathologist, one Oral Surgeon, one Orthodontist, one Pediatric Dentist, two Periodontists, and five Prosthodontists.

Question 23: Assuming the bonus amount you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following combinations of incentives:

- Homesteading for two consecutive years, platform type of your choice, and full-time postgraduate training (HS_PT_PG)
- Homesteading for two consecutive years, platform type of your choice, and sabbatical (HS_PT_SABB)
- Homesteading for two consecutive years, full-time postgraduate training, and sabbatical (HS_PG_SABB)
- Platform type of your choice, full-time postgraduate training, and sabbatical (PT_PG_SABB)

Table 12 reflects 90 DC officers who responded to question 23. Additionally, it indicates the obligation amount required, as well as the amount the DC officers were either willing to forego or not forego.

Table 12. Money to Give Up to Receive Combinations of Three Non-Monetary Incentives (After: NDCNMIRS, SurveyMonkey)

Respondent	Obligation Amount	HS_PT_PG	HS_PT_SABB	HS_PG_SABB	PT_PG_SABB
1	$200,000	$25,000	$25,000	$25,000	$25,000
2	$300,000	$0	$0	$0	$0
3	$100,000	$0	$100,000	$0	$0
4	$80,000	$0	$0	$0	$0
5	$400,000	$0	$0	$0	$0
6	$50,000	$0	$0	$0	$0
7	$200,000	$0	$0	$0	$0
8	$200,000	$0	$0	$0	$0
9	$100,000	$0	$0	$0	$0
10	$50,000	$0	$0	$0	$0
11	$50,000	$50,000	$40,000	$40,000	$40,000
12	$200,000	$110,000	$60,000	$90,000	$70,000
13	$200,000	$0	$0	$0	$0
14	$80,000	$0	$0	$0	$0
15	$50,000	$0	$0	$0	$0

Respondent	Obligation Amount	HS_PT_PG	HS_PT_SABB	HS_PG_SABB	PT_PG_SABB
16	$25,000	$10,000	$10,000	$10,000	$10,000
17	$30,000	$0	$0	$0	$0
18	$120,000	$0	$50,000	$0	$0
19	$70,000	$0	$0	$0	$0
20	$50,000	$0	$0	$0	$0
21	$100,000	$12,000	$10,000	$10,000	$10,000
22	$140,000	$35,000	$20,000	$35,000	$35,000
23	$100,000	$100,000	$0	$0	$0
24	$300,000	$75,000	$75,000	$75,000	$75,000
25	$400,000	$0	$50,000	$0	$0
26	$360,000	$15,000	$5,000	$0	$0
27	$200,000	$10,000	$0	$0	$0
28	$75,000	$0	$75	$0	$0
29	$100,000	$30,000	$30,000	$30,000	$10,000
30	$300,000	$50,000	$20,000	$50,000	$50,000
31	$400,000	$0	$0	$0	$0
32	$300,000	$0	$0	$0	$0
33	$50,000	$0	$50,000	$0	$0
34	$200,000	$50,000	$30,000	$50,000	$50,000
35	$1,000,000	$0	$0	$0	$0
36	$200,000	$0	$0	$0	$0
37	$2,000,000	$200,000	$1	$200,000	$200,000
38	$200,000	$0	$0	$0	$0
39	$100,000	$0	$0	$0	$0
40	$400,000	$1	$1	$1	$1
41	$40,000	$30,000	$0	$30,000	$30,000
42	$70,000	$10,000	$0	$10,000	$0
43	$400,000	$0	$0	$0	$0
44	$80,000	$60,000	$50,000	$40,000	$20,000
45	$100,000	$0	$0	$0	$0
46	$100,000	$20,000	$0	$0	$0
47	$200,000	$0	$0	$0	$0
48	$75,000	$0	$0	$0	$0
49	$100,000	$0	$0	$0	$0
50	$80,000	$0	$0	$0	$0
51	$250,000	$1	$200,000	$1	$1
52	$300,000	$0	$0	$0	$0
53	$230,000	$0	$0	$0	$0
54	$50,000	$0	$0	$0	$0
55	$300,000	$5,000	$5,000	$5,000	$5,000
56	$120,000	$30,000	$20,000	$30,000	$30,000
57	$200,000	$150,000	$100,000	$200,000	$150,000
58	$200,000	$0	$0	$0	$0
59	$50,000	$40,000	$30,000	$40,000	$25,000
60	$20,000	$20,000	$20,000	$20,000	$20,000

Respondent	Obligation Amount	HS_PT_PG	HS_PT_SABB	HS_PG_SABB	PT_PG_SABB
61	$500,000	$0	$0	$0	$0
62	$120,000	$0	$50,000	$0	$0
63	$100,000	$0	$0	$0	$0
64	$50,000	$20,000	$20,000	$15,000	$15,000
65	$50,000	$0	$0	$0	$0
66	$120,000	$120,000	$60,000	$120,000	$80,000
67	$50,000	$0	$0	$0	$0
68	$200,000	$0	$0	$0	$0
69	$280,000	$80,000	$0	$80,000	$0
70	$50,000	$0	$0	$0	$0
71	$120,000	$50,000	$100,000	$20,000	$10,000
72	$300,000	$0	$0	$0	$0
73	$80,000	$0	$0	$0	$0
74	$150,000	$0	$0	$0	$0
75	$80,000	$0	$40,000	$0	$0
76	$100,000	$20,000	$30,000	$20,000	$10,000
77	$75,000	$0	$0	$0	$0
78	$300,000	$0	$0	$0	$0
79	$200,000	$0	$0	$0	$0
80	$50,000	$10,000	$0	$0	$0
81	$200,000	$0	$0	$0	$0
82	$2,000,000	$10	$10	$10	$1,000,000
83	$80,000	$0	$0	$0	$0
84	$200,000	$0	$0	$0	$0
85	$300,000	$25,000	$25,000	$30,000	$10,000
86	$400,000	$0	$100,000	$0	$0
87	$40,000	$30,000	$20,000	$20,000	$20,000
88	$300,000	$0	$0	$0	$0
89	$200,000	$0	$100,000	$0	$0
90	$100,000	$0	$0	$0	$0

Figure 23 indicates the average obligation amount required by the DC officers and the average amount DC officers were willing to give up to receive the combinations of three non-monetary incentives. Additionally, n represents the number of useful responses.

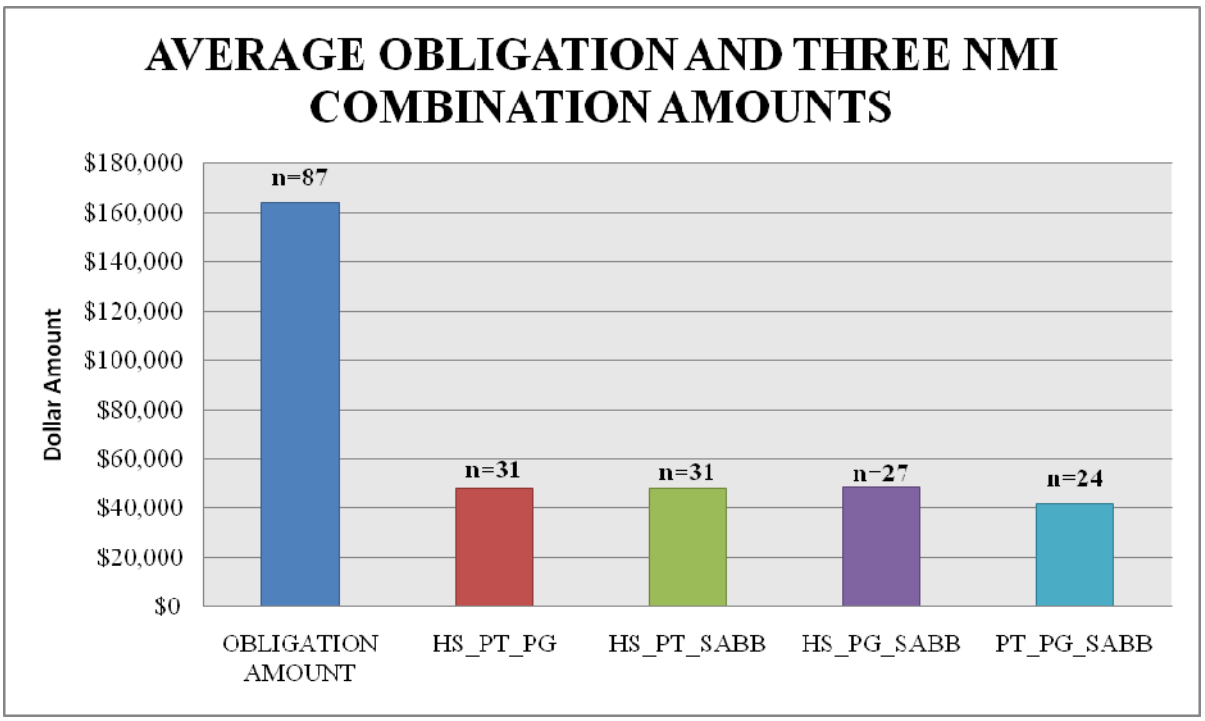

Figure 23. Average Obligation and Three NMI Combination Amounts (After: NDCNMIRS, SurveyMonkey)

The number of DC officers and the dollar amount ranges as illustrated in Table 8 are as follows.

- Thirty-four DC officers were willing to give up in the range of one dollar to two hundred thousand dollars for homesteading for two consecutive tours, platform type of choice, and full-time postgraduate training only.
- 35 DC officers were willing to give up in the range of one dollar to two hundred thousand dollars for homesteading for two consecutive tours, platform type of choice, and sabbatical only.
- 30 DC officers were willing to give up in the range of one dollar to two hundred thousand dollars for homesteading for two consecutive tours, full-time postgraduate training, and sabbatical only.
- 27 DC officers were willing to give up in the range of one dollar to one million dollars for platform type of choice and full-time postgraduate training, and sabbatical only.

Of the 90 DC officers who responded, 43 DC officers were willing to give up money to receive non-monetary incentives. Forty-seven DC officers were not willing to forego any bonus payment; 13 DC officers were willing to forfeit a portion of bonus

payment for one of the four options provided; three DC officers were willing to relinquish a portion of bonus payment for two of the four options provided; one DC officer was willing to decline a portion of bonus payment for three of the four options provided; and 26 DC officers were willing to cede a portion of bonus payment for all four options provided.

The results showed that of the 43 DC officers, 10 female and 33 male DC officers were willing to give up money to receive non-monetary incentives. Twenty-two DC officers were in the O-3 and O-3E pay grades, whereas 21 DC officers were in the O-4 to O-6 pay grades. Thirty-two DC officers were married; seven indicated a single, never married status; and four indicated a divorced, separated, widowed status.

Of the 43 DC officers willing to forego money, there were eight Comprehensive Dentists, one Endodontist, one Exodontist, 22 General Dentists, one Operative Dentist, one Oral Pathologist, one Oral Surgeon, one Orofacial Pain Dentist, one Pediatric Dentist, one Periodontist, and five Prosthodontists.

Question 24: Assuming the bonus amount you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed all four incentives:

- Homesteading for two consecutive years, platform type of your choice, full-time postgraduate training, and sabbatical (HS_PT_PG_SABB)

Table 13 reflects that 90 DC officers responded to question 24. Additionally, it indicates the obligation amount required, as well as the amount the DC officers were either willing to forego or not forego. Of the 90 DC officers, only 40 DC officers were willing to forfeit bonus payment to receive all four non-monetary incentives and the amount ranged from five thousand dollars to one million dollars, whereas 50 DC officers were not willing to forego any bonus payment for this combination.

Table 13. Money to Give Up to Receive Combinations of Four Non-Monetary Incentives (After: NDCNMIRS, SurveyMonkey)

Respondent	Obligation Amount	HS_PT_PG_SABB
1	$200,000	$25,000
2	$300,000	$0
3	$100,000	$100,000
4	$80,000	$0
5	$400,000	$0
6	$50,000	$0
7	$200,000	$10,000
8	$200,000	$0
9	$100,000	$0
10	$50,000	$0
11	$50,000	$50,000
12	$200,000	$110,000
13	$200,000	$0
14	$80,000	$0
15	$50,000	$0
16	$25,000	$15,000
17	$30,000	$0
18	$120,000	$0
19	$70,000	$0
20	$50,000	$0
21	$160,000	$20,000
22	$100,000	$12,000
23	$140,000	$35,000
24	$100,000	$100,000
25	$300,000	$75,000
26	$400,000	$0
27	$360,000	$15,000
28	$200,000	$10,000
29	$75,000	$0
30	$100,000	$30,000
31	$300,000	$50,000
32	$400,000	$0
33	$300,000	$0
34	$50,000	$0
35	$200,000	$60,000
36	$1,000,000	$0
37	$200,000	$0
38	$2,000,000	$300,000
39	$200,000	$0
40	$100,000	$0
41	$400,000	$200,000
42	$40,000	$30,000
43	$70,000	$10,000

Respondent	Obligation Amount	HS_PT_PG_SABB
44	$400,000	$0
45	$80,000	$60,000
46	$100,000	$0
47	$100,000	$25,000
48	$200,000	$0
49	$75,000	$0
50	$100,000	$0
51	$80,000	$0
52	$250,000	$200,000
53	$300,000	$0
54	$230,000	$0
55	$50,000	$0
56	$300,000	$5,000
57	$120,000	$30,000
58	$200,000	$200,000
59	$200,000	$0
60	$50,000	$50,000
61	$20,000	$20,000
62	$500,000	$0
63	$100,000	$0
64	$50,000	$30,000
65	$50,000	$0
66	$100,000	$0
67	$120,000	$120,000
68	$50,000	$0
69	$200,000	$0
70	$280,000	$80,000
71	$50,000	$0
72	$120,000	$120,000
73	$300,000	$0
74	$80,000	$0
75	$150,000	$0
76	$80,000	$40,000
77	$100,000	$30,000
78	$75,000	$0
79	$300,000	$0
80	$200,000	$0
81	$50,000	$20,000
82	$200,000	$0
83	$2,000,000	$1,000,000
84	$80,000	$0
85	$200,000	$0
86	$300,000	$30,000
87	$400,000	$100,000
88	$40,000	$30,000

Respondent	Obligation Amount	HS_PT_PG_SABB
89	$300,000	$0
90	$200,000	$100,000

The results showed that of the 40 DC officers, nine female and 31 male DC officers were willing to give up money to receive all four non-monetary incentives. Twenty-one DC officers were in the O-3 and O-3E pay grades, whereas 19 DC officers were in the O-4 to O-6 pay grades. Thirty DC officers were married; seven indicated a single, never married status; and three indicated a divorced, separated, widowed status.

Of the 40 DC officers willing to forego money, there were seven Comprehensive Dentists, one Endodontist, one Exodontist, 22 General Dentists, one Operative Dentist, one Oral Pathologist, one Oral Surgeon, one Orofacial Pain Dentist, one Pediatric Dentist, two Periodontists, and two Prosthodontists.

Figure 24 indicates the average obligation amount required by the DC officers and the average amount DC officers were willing to give up to receive the combinations of all four non-monetary incentives. Additionally, n represents the number of useful responses.

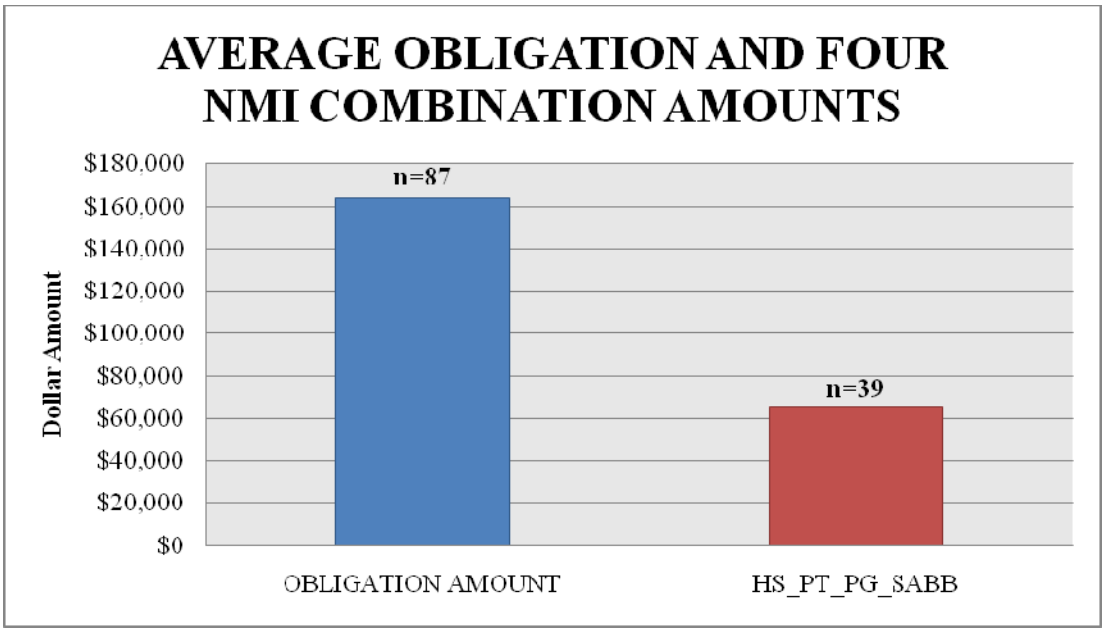

Figure 24. Average Obligation and Four NMI Combination Amounts (After: NDCNMIRS, SurveyMonkey)

Question 25: List any other measurable characteristics (e.g. previous civilian experience) that increase a Dentist's value to the Navy

Table 14 indicates the measurable characteristics, and of the 68 useful responses, 56 DC officers mentioned 'experience' as the number one measurable characteristic that increases a dentist's value to the Navy. Additionally, postgraduate training, flexibility, speed, board certification, prior deployments, service to country, involvement in dental associations, unique knowledge base, leadership skills, and production ability were listed as other measurable characteristics. One of the respondents gave some specific measurable characteristics, such as Body Composition Assessment to be less than 19, Physical Fitness Score of excellent over the last three cycles, age between 30 and 45, class ranking in top 25 percentile, Intelligence Quotient over 140, single marital status, language skills, and prior military experience.

Table 14. Measurable Characteristics (After: NDCNMIRS, SurveyMonkey)

Respondent	Measurable Characteristics that Increase a Dentist's Value to the Navy
1	Private Practice as Owner
2	Time in service
3	Civilian Experience / Continuing Education
4	Board Certification / Scope of Practice / Proficiency and skill within specialty
5	Clinical Experience (More than 5 yrs) / Post Graduate training
8	Previous Civilian Experience / Continuing Education Courses / Specialty Training / Residency Training
9	Experience / Willingness for Multidisciplinary Practice
10	More than 12 Years Experience / Comprehensive Private Practice Experience
11	Residency Trained (AEGD or GPR)
12	Previous Civilian Experience / Reserve Experience
13	Prior Enlisted
14	Previous Civilian Experience / GPR
15	GPR or AEGD Training Prior to Operational Duty.
16	Leadership Abilities Since they have Owned a Practice and Managed Employees Prior to Joining the Service.
17	Previous Civilian Experience Credentials (specialty training, FAGD/MAGD, etc.)
18	Civilian Experience, Prior Enlisted Experience / GPR, AEGD, Specialty Training
19	Previous Enlisted Training / Clinical Leadership Role / Clinical Mentor Jobs / Residency Training / Civilian Moonlight Jobs / Number of Procedures Done on a Oral / Dental Problem / Pathology
20	Previous Ethical Civilian Practice / Board Certified in Specialty / Teaching Experience
21	Continuing Education in the Civilian Sector
22	Leadership Experience / Recognized Expertise
23	Prior Leadership in Any Setting

Respondent	Measurable Characteristics that Increase a Dentist's Value to the Navy
24	Master's Degree / Research Experience / Medical Support Training
25	Operational Experience / GPR, AEGD, Specialty Training
27	Autonomy/ IQ / Social Competence / Dental Knowledge
28	Chair side Experience
30	Years of Practice
31	Postgraduate Training at Any Level
33	Prior Deployments / Leadership Roles / Production
34	Specialty Experience Prior to Accession Related to Contingency and Operational Mission / Time in Service / Teaching and Education / Mentoring Experience
35	Knowledge in Advanced Restorative Techniques / Surgical Skills
36	Involvement in Local and National Dental Associations
37	Previous Civilian Experience
38	Participation in Civilian Professional Societies / ADA Site Visitor / Humanitarian Volunteer
39	Previous Military Dental Specialty Experience from Another Branch Especially with the Multi Force Units
40	Service to Country
42	Flexibility
43	Desire to Serve
44	Unique Knowledge Base
45	Previous Military Experience (Enlisted or Other Branch) / Willingness and Effectiveness in Recruiting More Dentists / Executive, Management, Leadership Skills
46	Operation Dentist (Specialist) / Hard Workers / Good Producers (High Readiness)
47	Private Practice
48	Civilian Experience and Production
49	BCA<19 / Fitness Score = Excellent Over Last 3 Cycles / Age>30 but <45 / Class Rank in Top 25% / IQ over 140 / Marital Status = Single / Language Skills / Prior Military Service
50	Previous Civilian Experience / Previous Master's / Post Graduate Training / Leadership Qualities / Value as Educator / Managerial Skills
51	Previous Private Practice Experience / 1 Year GPR / AEGD Immediately after Dental School
52	Civilian Experience / Prior Military Experience / Comprehensive Ability Allows Multiple Assignment Options
53	GPR on the Outside
54	Civilian Experience / Personal Deployability
55	Board Certification / Prior Civilian Practice
56	Speed
57	Operational Experience / Postgraduate Training
58	Civilian Experience
59	Military Trained Individuals Who Understand Readiness and Willing to Get the Job Done / Dentist that Work 5 days a Week and Other Times (Operational) / Provide Quality Dental Treatment
60	Clinical Experience / Admin Experience / Physical Fitness / Willingness to Deploy / Willingness to PCS every 3 Years to a New Location
62	Production Ability of the Dentist
63	Solo Practice of Greater than Two Years Prior to Entering the Navy / Civilian Residencies

Respondent	Measurable Characteristics that Increase a Dentist's Value to the Navy
64	Flexibility
65	Teaching Experience / Physical Health and Condition / Multiple Specialty Qualifications
66	Completing Some Sort of PG Study (AEGD, GPR, Specialty Training)
67	Previous Enlisted Military Experience Prior to Dental School / Prior Dental Hygienist in the Civilian World
68	Operational Experience

Question 26: List any other non-monetary incentive(s) (e.g. compressed work week, promotion opportunity/timeline, and support staff) that the Navy could offer which would be attractive to you.

Table 15 shows there were 82 useful responses. Of the 82 DC officers who responded, 14 were female and 70 were male DC officers. Forty-six DC officers stated 'compressed work-week' as the preferred non-monetary incentive, which indicates that over 56 percent of the DC officers who responded would like to have a shorter work week.

Table 15. Other Non-Monetary Incentives (After: NDCNMIRS, SurveyMonkey)

Respondent	Gender	Age	Pay Grade	Marital Status	Other Non-Monetary Incentives
1	Male	51 and above	O-6	Married	Promotion Member of Policy Board
2	Male	41-50	O-5	Single, never married	Compressed Work Week / Increase More Fair Promotion Opportunity
3	Male	41-50	O-5	Married	End the 2-3 Year PCS Cycle
4	Male	31-40	O-3	Married	Work 4 Days Per Week Like in Civilian World / More Autonomy / Better Support Staff
5	Male	31-40	O-4	Married	Merit Based Promotion
6	Male	51 and above	O-5	Married	Compressed Work Week / Better Promotion Opportunity and Timeline
7	Female	41-50	O-5	Married to a military member	Reduce Deployment Time
8	Male	51 and above	O-6	Married	Compressed Work Week / Flexible Work Week
9	Male	51 and above	O-6	Married	Compressed Work Week / Faster Promotion / Better Support Staff
10	Male	51 and above	O-6	Married	Compressed Work Week

Respondent	Gender	Age	Pay Grade	Marital Status	Other Non-Monetary Incentives
11	Female	31-40	O-3	Married to a military member	Flexible Schedules / Incentive Time Off / Highly Trained Support Staff / Increased Lines of Communication / Timely Delivery of Supplies / Increased Independence / Hospital Staying Out of Dental Issues
12	Male	21-30	O-3	Married	Compressed Work Week / Promotion Opportunity / More Civilian Support Staff
13	Male	21-30	O-3	Married	Compressed Work Week / Decreased Duty Responsibilities for Junior Officers
14	Male	31-40	O-4	Married to a military member	4 Day Work Week / Ability to go Home when Work is Done for the Day
15	Male	41-50	O-5	Single, never married	Promotion Opportunity and Timeline / Increased Support / More Civilian Education Opportunities
16	Female	21-30	O-3	Single, never married	Two Career Paths / Promotion Sooner and Higher if Administrative Role Taken Versus Clinical Practice
17	Male	51 and above	O-6	Married	Trained Support Staff Without Constant Turnover
18	Male	31-40	O-3	Married	Having the Ability to be Promoted to O-5, O-6 Without Specializing / Allowing Shorter Work Week / Time for Admin Work Other than After Hours
19	Male	21-30	O-3	Married	Faster Advancement
20	Male	21-30	O-3	Married	Better Supply System / Updated Operatories / Professional Assistants as Opposed to 17-20 Year Olds that Do Not Care About their Jobs
21	Female	31-40	O-4	Married to a military member	Compressed Work Week / Ability to Raise a Family and Have Children / Promotion More Frequently
22	Male	31-40	O-3	Married	Compressed Work Week (4-Day Work Week) / Guaranteed Promotion to O-6 / Proper Staffing Levels
23	Male	21-30	O-3	Married to a military member	4 Day Work Week at Shore Billets
24	Male	21-30	O-3	Married	Faster Timeline for Promotion / Specialty and Postgraduate Training Sooner in Career
25	Male	31-40	O-3E	Married	Compressed Work Week / Chance to Promote Earlier / More Trained Dental Assistants

Respondent	Gender	Age	Pay Grade	Marital Status	Other Non-Monetary Incentives
26	Male	41-50	O-4	Married	More Number of Residents Being Accepted Per Residency and Specialty Program / Less Number of Working Days / Faster Promotions / Less Number of Years Before Being Selected for Promotion / Better Choices of Duty Stations / Duty Station Preference / Be Accepted to Residency Training of Choice
27	Male	51 and above	O-6	Divorced, Separated, Widowed	90% Promotion Opportunity for O-6 / Multiple O7 and O8 Positions / Reestablish the Dental Corps / Remove Dental Corps from Medical Corps
28	Female	41-50	O-5	Divorced, Separated, Widowed	Compressed Work Week / Better Support Staff
29	Male	51 and above	O-6	Married	Flexible Work Week / Improved Promotion Opportunity / Reliable Support Staff / Effective and Competent IT Support
30	Female	51 and above	O-6	Married	Compressed Work Week / Keep the Military Dental Technicians in the Technical Jobs Rather Than Admin Jobs
31	Male	31-40	O-4	Married	More Support Staff / Compressed Work Week / Faster Promotion
32	Male	31-40	O-3	Married	Promotion Opportunity / Compressed Work Week / Less Bureaucratic Training (NKO)
33	Male	41-50	O-6	Married	95% Promotion to 0-6 / Better Support Staff / Compressed Work Week
34	Female	31-40	O-3	Single, never married	Higher Quality of Support Staff
35	Male	21-30	O-3	Married	Autonomy and Respect
36	Male	51 and above	O-5	Married	Better Promotion Opportunity
37	Male	41-50	O-5	Married	Better Quality Support Staff
38	Male	31-40	O-3	Married	4 Day Work Week
39	Male	21-30	O-3	Married	Residency
40	Female	21-30	O-3	Single, never married	Excellent Trained Support Staff / Being Treated with Respect
41	Male	21-30	O-3	Married	Flex Hours / More Participation in Tour Selection / Option of Longer Tours (move every 4-5 years instead of 2-3)
42	Male	31-40	O-4	Married	Improved Support Staff / Ease of Obtaining Supplies

Respondent	Gender	Age	Pay Grade	Marital Status	Other Non-Monetary Incentives
43	Male	21-30	O-3	Married	Assuring that Support Staff is Fully Trained at an Accredited Program Before Being Employed / Promotion from LT to LCDR Should Be A Three Year Marker
44	Male	41-50	O-6	Married	Full Scope of Practice / Better Appreciation for the Dual Career Family / Sufficient and Well Trained Support Staff / Sufficient Time for Research and Publishing / Adjusted Productivity Targets for Research and Publishing Activity
45	Male	41-50	O-4	Divorced, Separated, Widowed	Faster Promotions / Better Funding for Supplies and Equipment / Updated Offices
46	Female	31-40	O-3E	Married to a military member	Compressed Work Week / Report Cards FITREPS Based on Work Versus Politics
47	Male	41-50	O-5	Married	Compressed Work Week / Moon-Lighting / Guaranteed Promotion / Less Oversight from Leadership / Less Dependence on Contractors and Non-military Providers
48	Male	51 and above	O-6	Single, never married	Promotion Opportunity on Parallel with Most Expeditious Corps (e.g. Medical Corps)
49	Male	31-40	O-4	Married	Compressed Work Week
50	Male	41-50	O-6	Married	Flex Time
51	Male	31-40	O-3E	Married	Compressed Work Week / Working Five Days a Week with One Full Week Off Per Month to Work in Civilian Practice
52	Male	51 and above	O-5	Married	Compressed Work Week
53	Male	31-40	O-4	Married	Additional Leave
54	Male	31-40	O-4	Married	4 Day Work Week / Increased Opportunity for Promotion to O-6 Beyond Executive Medicine
55	Female	41-50	O-3	Married to a military member	More Obtainable Promotion Opportunity
56	Female	21-30	O-3	Single, never married	Shorter Work Week / Better Trained Staff

Respondent	Gender	Age	Pay Grade	Marital Status	Other Non-Monetary Incentives
57	Male	31-40	O-3	Divorced, Separated, Widowed	Decrease Non-Dental Related Work (Collateral Duties) / Increase Promotion Rates / Eliminate "Amalgam-Line" Mentality and Allow General Dentists to Perform More Varied Types of Procedures (i.e. pros, endo, perio)
58	Female	21-30	O-3	Married	Compressed Work Week / More Liberty
59	Male	31-40	O-3	Married	4 Day Work Week / Well Trained Support Staff / Good Advancement Opportunity
60	Male	21-30	O-3	Married	Compressed Work Week / Promotion Consideration Should Come Early for "hard chargers." Those are People that Deploy, Have Excellent Quality of Work and Produce Much Higher than the Average Dentist
61	Female	51 and above	O-5	Married	Promotion
62	Male	51 and above	O-6	Married	Consistent Chairside Help / Reestablish Dental Commands / More TAD Training Opportunities-Guaranteed 2 Per Year
63	Male	51 and above	O-6	Married	Flex Time / Adequate Support Personnel / Best Equipment / Quality CE at No Cost to Me
64	Male	21-30	O-3	Single, never married	Additional Paid Leave Time / Spouse(Family) Location Benefits
65	Male	51 and above	O-6	Married	Promotion Opportunity and Time Line
66	Male	31-40	O-3	Married	More Ability to Work as Own "Boss" / Ordering Supplies and Treatment Plans that are Provider Specific / Seeing the Patient on a Routine Basis Instead of Passing from One Provider to the Next
67	Male	41-50	O-5	Married	Split Shift Program should be Reactivated
68	Male	51 and above	O-6	Married	Compressed Work Week / Sufficient Support Staff / Detailing Equity
69	Male	41-50	O-6	Married	Compressed Work Week
70	Male	31-40	O-4	Married	Compressed Work Week / More Choices of Duty Stations
71	Male	21-30	O-3	Married	Four Day Week
72	Male	41-50	O-6	Single, never married	Promotion Opportunity to 06 Needs to Improve to Retain Career Minded Officers / Quality of Lab Techs and Chairside Assistants Needs to Be Increased / Restore DT Rating

Respondent	Gender	Age	Pay Grade	Marital Status	Other Non-Monetary Incentives
73	Male	41-50	O-5	Married	Appropriate Amount of Support Staff / Promotion Opportunity
74	Male	41-50	O-6	Married to a military member	More Providers and Support Staff / Increased Choice of Duty Stations (i.e., Eliminate Homesteading for >2 tours) / Compressed Work Week
75	Male	41-50	O-5	Married	Time Off to Moonlight / Time Off with Family so the Job Seem to be "Worth" More than the Pay
76	Female	51 and above	O-6	Married	Compressed Work Week / Adequately Trained and Motivated Assistants
77	Male	31-40	O-3	Single, never married	Compressed Work Week / Better Billeting
78	Male	51 and above	O-6	Married	Compressed Week - Three 12hr or Four 10hr Days
79	Male	21-30	O-3	Single, never married	Guarantee that We will Not be Pulled for IA while at a Shore Command / Increased Billet Availabilities at Shore Duty Stations / Less Civilian Dentists
80	Male	31-40	O-3	Married	Compressed Work Week
81	Male	51 and above	O-5	Married	No Cost TAD Opportunities / Dental Libraries in the Larger Clinics that are Current / One Day Continuing Education Opportunities
82	Male	41-50	O-5	Married	Better Promotion Opportunities (like the Air Force!) / Compressed Work Week

Of the 46 DC officers who selected 'compressed work-week,' 42 DC officers were married, which might be an indication that married DC officers desired more off-time to spend with family and/or take care of other responsibilities. Of the 14 female DC officer respondents, eight preferred 'compressed work-week' and 36 of the 70 male DC officers preferred 'compressed work-week.' Additionally, female and male DC officer pay grades ranged from O-3 to O-6. Eleven of the 17 specialties were represented for those who chose 'compressed work-week' as other non-monetary incentive. Twenty-nine DC officers preferred to have greater 'promotion opportunity.' Other non-monetary incentives preferred by DC officers include additional leave, quality support staff,

reduced deployments, increased family benefits, no-cost temporary duty opportunities, reestablish Dental Corps (separate Hospital Corpsman/Dental Technician rating), change 2–3 year Permanent Change of Station (PCS) cycle to 4–5 year PCS cycle.

Question 27: Please indicate the amount of the bonus you would be willing to give up, to receive the incentive(s) that you mentioned in question #26.

There were 68 useful responses. Of the 64 responses, 40 DC officers indicated that they would not forego any bonus to receive the preferred non-monetary incentive.

Figure 25 depicts the amount in dollars that DC officers were willing to forego for the preferred non-monetary incentive(s). Of the 64 respondents, 24 DC officers were willing to give up between ten thousand to seventy-five thousand dollars.

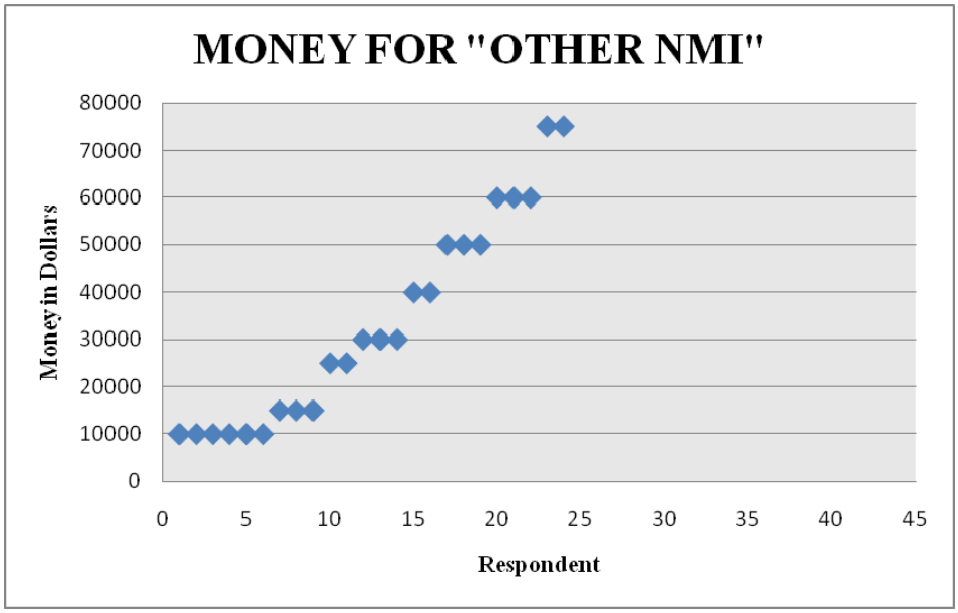

Figure 25. Money Given Up for Other NMI (After: NDCNMIRS, SurveyMonkey)

B. MODELING RESULTS

The data from the 'Naval Dental Corps Non-Monetary Incentives Retention Survey' were used to run Oracle Crystal Ball Monte Carlo simulations of the various retention mechanisms. Specifically, three separate reverse second-price auction mechanisms were simulated: Monetary, UIP, and CRAM. For the 50, 61, and 75 percent

retention levels, as shown in Table 16, 1,000 trials were simulated to obtain an adequate range of outcomes. The results obtained from simulating UIP and CRAM auctions were then compared to the monetary only auction.

NMI costs were generated based on the NMI values provided by the DC officers in questions 20 through 24, because actual costs have not been estimated for the NMIs offered.

Each mechanism was simulated at the 50, 61, and 75 percent retention levels as shown in Table 16. For perspective, the Navy's current retention target for DC officers in the FY05 cohort is 61 percent; of the 80 DC officers who entered in FY05, the DC intends to retain 49 DC officers to meet billet requirements in support of Navy and Marine Corps Dental Readiness. (R. Gilliard, personal communication, March 2, 2010) The 50 and 75 percent retention level simulations were selected to determine sensitivity to marginal changes in retention

1. Monetary Only Simulation

In simulating the monetary-only auction, each DC Officer's response from question 20 was used to determine the required bonus to commit for four more years of active duty. The DC officers were then ranked in ascending order. The set of *n* DC officers submitting the lowest bids were retained and each paid the cash bonus of the first excluded bid (i.e., the *n+1st* lowest bid). The number of DC officers retained (*n*) varied according to the retention levels as shown in Table 16.

Table 16. Simulation Types (After: Zimmerman, Master's Thesis, p. 93)

Parameter	Values Simulated
Retention Mechanism	1. Monetary incentives alone
	2. Universal Incentive Package (UIP) 75% cutoff for NMI inclusion in package
	3. Combinatorial Retention Auction Mechanism (CRAM)
Retention Levels	1. 50% of population retained
	2. 61% of population retained
	3. 75% of population retained
Cost Assumptions	1. Varying Percentile (All Positive) NMI costs vary over entire non-zero range of bidder values

2. UIP Simulation

In simulating the UIP mechanism, any NMI offered by the Navy is available to all retained DC officers. However, this analysis assumes that the Navy makes informed decisions regarding the UIP NMI combination. In particular, NMIs are only included in the UIP if at least 75 percent of the force expresses values for the NMIs that exceed the NMI's cost to provide. This limits the NMIs in the UIP to those most likely to have a positive benefit-cost ratio. The analysis also assumes that all DC officers who express a positive value for an incentive use the incentive. DC officers who do not express a willingness to forego any portion or their monetary bonus for an NMI may still take advantage of the opportunity given that the incentive is offered at no cost.

To determine the net benefit of retaining DC officers, three assumptions about usage of NMIs included in a UIP were compared (Zimmerman, 2008).

- UIP(0)–Only those sailors who placed a positive value on the NMI will actually use it
- UIP(50)–50% of those who place no value on the NMI will also use it
- UIP(100)–Everyone retained will use the NMI (p. 95).

3. CRAM Simulation

The CRAM simulation considered individual NMIs, and combinations of two, three, and four non-monetary incentives. As above, NMI costs were randomly generated based on the range of values the dentists provided in their survey responses; randomly picking a cost number from the range of positive NMI values.

A key aspect of modeling CRAM is managing the incentive package offered to each dentist. An incentive package can include one single NMI, a combination of two NMIs, a combination of three NMIs, or all four NMIs. The NMI package cannot contain any combination of the previous options (i.e., two individual NMIs; that is actually a combination of two, etc.). When a dentist's value exceeds cost for more than one NMI or combination of NMIs, CRAM assigns the NMI combination that provides the dentist the maximum surplus value. The key concept behind CRAM is that the value each retained

DC officer receives either equals or exceeds the Navy's cost to provide the retention incentive package, and each incentive package maximizes the dentists' value of the bonus received.

4. Varying Percentile (All Positive) Results

In the Varying Percentile (All Positive) (VP(AP)) method, each NMI cost was drawn from the range of positive NMI values. The Monte Carlo simulation selected a percentage for each NMI in each simulation trial; that percentage identified the NMI value used as a proxy for cost for that NMI in that simulation trial.

Figure 26 shows the dollar savings and indicates that Monetary-CRAM outperformed Monetary-Universal(0) and Monetary-Universal(100) for all retention rates, with the savings increasing as retention increases.

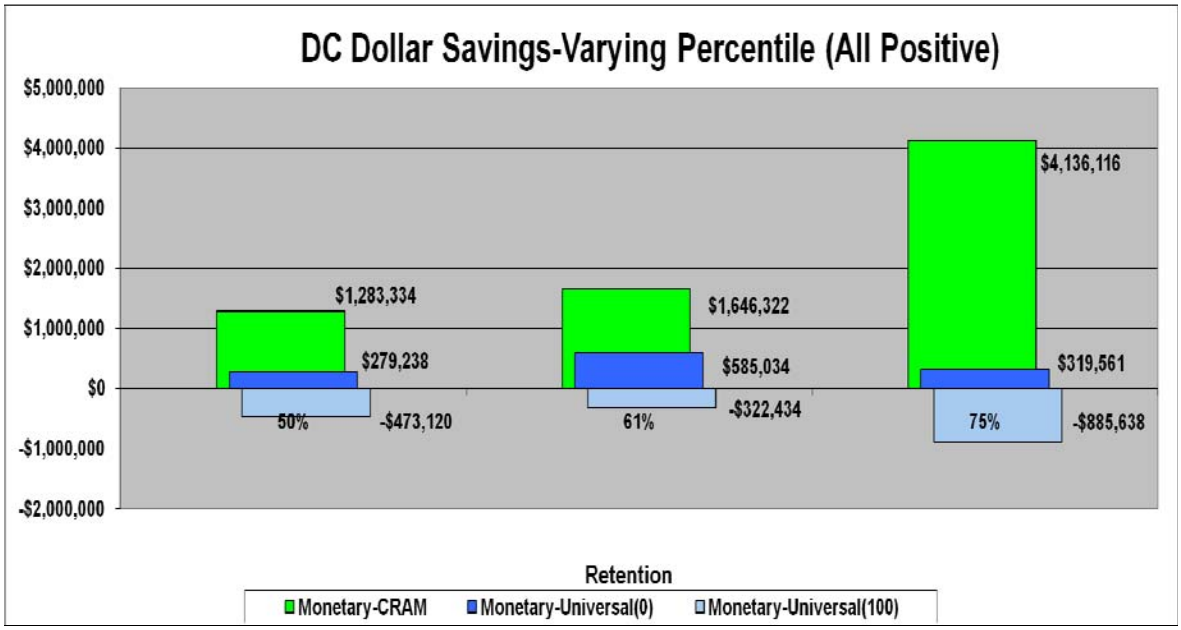

Figure 26. DC Dollar Savings VP(AP) (After: NDCNMIRS, SurveyMonkey)

Figure 27 displays the percent savings for the VP(AP) simulations. The CRAM produced an average savings over monetary ranging from 24 percent to 30 percent. UIP(100) was actually more expensive than the monetary only retention bonus; UIP(0) indicates an average savings of 8.5 percent.

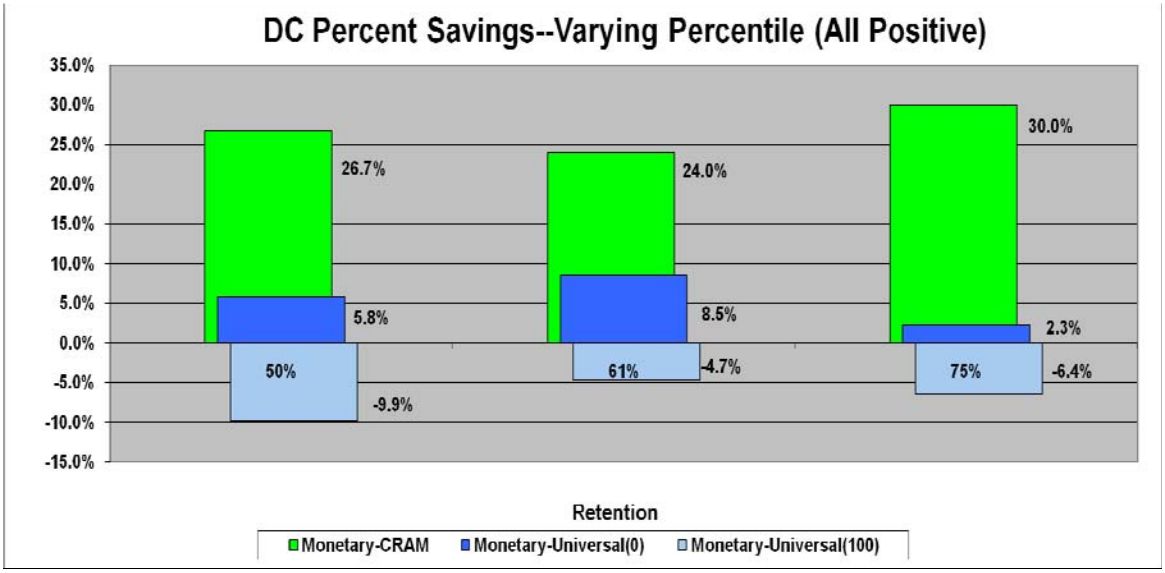

Figure 27. DC Percent Savings VP(AP) (After: NDCNMIRS, SurveyMonkey)

To summarize, the CRAM offers significant cost savings over both purely monetary incentives and the universal incentive package, even when the NMIs in the UIP are carefully limited to incentives offering a positive surplus value to a significant portion of the DC. Cost-effectiveness for the UIP depends critically on how many dentists use the incentives offered. If use is limited to those expressing a positive value for the NMI, UIP may reduce the Navy's cost relative to monetary-only retention incentives. If most dentists elect the NMIs in the UIP, the latter can be significantly more costly than monetary-only retention incentives. In all cases, the CRAM significantly reduces the Navy's retention costs compared to the UIP and monetary-only retention incentives.

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V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. SUMMARY

This research focused on the naval officers serving in the Dental Corps (DC), which is experiencing retention challenges despite the downturn in the U.S. economy. The primary objective of this research was to identify if the Combinatorial Retention Auction Mechanism (CRAM) offering a portfolio of non-monetary and monetary incentives provided a more cost-effective means to influence retention behavior than offering monetary incentives alone. The secondary objectives were the following.

- Find a mix of monetary/non-monetary incentives that would be both valued by dentists and cost-effective for the Navy.
- Develop an operational auction design that would allow the Navy to tailor monetary/non-monetary retention incentive packages to individual dentists while simultaneously economizing on Navy resources.
- Identify the cost savings the Navy might expect by moving from purely monetary incentives to a portfolio of monetary/non-monetary incentives, if both retention incentive programs were optimally designed.
- Determine if population representation was affected by these retention incentive packages.

The Monte Carlo simulations were run using the results from a survey of Navy dentists. The simulations incorporated a Universal Incentive Package auction, the CRAM, and monetary-only methods; the results were compared to reveal the strengths and weaknesses of each mechanism.

B. CONCLUSIONS

The results of the survey and simulation clearly highlight the benefits of offering a mix of monetary and non-monetary incentives as opposed to monetary incentives only. Additionally, this research has shown that offering incentives based on individual preference can increase intrinsic motivation, which in turn, enhances commitment toward the organization, as well as personal and professional development.

The Oracle Crystal Ball Monte Carlo simulation indicated that the CRAM outperformed monetary only and universal auction mechanisms with an average savings between 24 to 30 percent. This research concluded that a 61 percent retention level could be achieved by offering CRAM with an average savings of 24 percent over monetary only and UIP. The research concluded that the CRAM provided an opportunity to individualize benefits not only valued by Dental Corps officers, but were also cost effective for the Navy. This research concluded that the results might be understated due to a low survey response rate, which could be attributed to confusion over Dental Corps support for this thesis.

C. RECOMMENDATION

Based on the results and conclusions, the following recommendation is provided in support of this thesis.

- The Dental Corps should implement a pilot project incorporating the most desirable non-monetary incentives, such as compressed workweek, homesteading, etc. utilizing CRAM based on individualized preferences. This will ensure that Dental Corps officers receive what they value, as well as eliminate the extra expenses incurred by offering incentives to individuals who do not have any value for the incentives.

D. FURTHER RESEARCH

Based on the author's background and survey investigation, they recommend further research in the following areas.

- Present true DC officer preferences and ensure statistically significant results.
- Discover the actual costs of the non-monetary incentives valued by Dental Corps officers.
- Increase the pay-back tour depending on the specialty, i.e., most expensive specialty in terms of providing education and training should have a longer pay-back as compared to other specialties.
- Design a scholarship program in a way that pay-back is commensurate to the cost incurred in providing dental education and training, i.e., individuals who prefer schools with high tuition and fees, such as the University of Southern California, the New York University, and the

University of Pennsylvania, should be required to obligate additional years of service as compared to an individual who graduates from a dental school with low tuition and fees.

- Create a mentorship program utilizing dental officers as protégés who have previous civilian experience and can portray the challenges encountered in the civilian sector.

E. FINAL CONSIDERATION

According to Chief of Naval Personnel, Vice Admiral Ferguson (2009):

> We believe that a Top 50 organization is one that has innovative programs for its people, that recognizes people as their most valuable asset and rewards them with an environment that is personally and professionally rewarding and challenging, that promotes a climate of respect and trust, that encourages development and provides the rewarding work of service. (U.S. Navy)

For the Navy to achieve this goal, it is imperative to create a balance between monetary and non-monetary incentives. This not only enhances morale but also overcomes work-related challenges.

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APPENDIX A

Naval Dental Corps Non-Monetary Incentives Retention Survey

Naval Postgraduate School Consent to Participate in Research

Introduction. You are invited to participate in a research study entitled "Naval Dental Corps Non-Monetary Incentives Retention Survey" as a part of our Master's thesis at Naval Postgraduate School. The purpose of this research is to analyze the feasibility of offering non-monetary compensation in lieu of part or all of monetary retention bonuses to increase retention, utilizing some form of combinatorial auction.

Procedures. We will obtain data for different monetary and non-monetary incentives provided to Dental Corps officers based on their specialty, rank, and location. The survey results will be analyzed to incorporate the monetary and non-monetary incentives in our model construction. Next, our focus will be to design the mathematical model to predict the outcomes based on the information collected from the survey.

The subjects will complete the survey, which will take no more than ten minutes. The subjects will not be exposed to any experimental conditions. The procedures have been tested before in which the target population included Air Traffic Controllers and Fire Controlman. The procedures are only related to the research and serve no purpose other than this research endeavor.

Voluntary Nature of the Study. Your participation in this study is strictly voluntary. If you choose to participate you can change your mind at any time and withdraw from the study. You will not be penalized in any way or lose any benefits to which you would otherwise be entitled if you choose not to participate in this study or to withdraw.

Potential Risks and Discomforts. The potential risks of participating in this study are: There are no potential risks and discomforts involved in participating in this study.

Anticipated Benefits. Anticipated benefits from this study are Benefits to the Navy could possibly be cost savings by using non-monetary incentives vice monetary incentives only and increased retention. Benefit to Dental Corps subjects will be higher morale through personal and professional satisfaction. You will not directly benefit from your participation in this research.

Compensation for Participation. No tangible compensation will be given. A copy of the research results will be available at the conclusion of the research via public release and unlimited distribution of the research report.
Confidentiality & Privacy Act. Any information that is obtained during this study will be kept confidential to the full extent permitted by law. All efforts, within reason, will be made to keep your personal information in your research record confidential but total confidentiality cannot be guaranteed. Personal identity will not be compromised as a result of participating in this survey.

Points of Contact. If you have any questions or comments about the research, or you experience an injury or have questions about any discomforts that you experience while taking part in this study please contact the Principal Investigator, Dr. William R. Gates at 831-656-2754 or bgates@nps.edu. Questions about your rights as a research subject or any other concerns may be addressed to the Navy Postgraduate School IRB Chair, Dr. Angela O'Dea, 831-656-3966, alodea@nps.edu.

Statement of Consent. I have read the information provided above. I have been given the opportunity to ask questions and all the questions have been answered to my satisfaction. I have been provided a copy of this form for my records and I agree to participate in this study. I understand that by agreeing to participate in this research and signing this form, I do not waive any of my legal rights.

Page 1

* **1. I agree to participate in this survey**

- ◯ Yes
- ◯ No

Page 2

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 2. Gender**

- ◯ Male
- ◯ Female

Page 3

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 3. Age**

- ◯ 21-30
- ◯ 31-40
- ◯ 41-50
- ◯ 51 and above

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 4. Pay grade**

- ◯ O3
- ◯ O3E
- ◯ O4
- ◯ O5
- ◯ O6

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 5. Years of active commissioned service completed**

- ◯ 0-2 years
- ◯ More than 2 but less than 4
- ◯ More than 4 but less than 5
- ◯ More than 5 but less than 6
- ◯ More than 6 but less than 10
- ◯ 10 to 12
- ◯ More than 12

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Naval Dental Corps Non-Monetary Incentives Retention Survey

* **6. Which dental school(s) did you graduate from?**

7. What was your GPA?

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 8. What is your Dental Specialty?**

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 9. How much experience do you have in your specialty?**

- ◯ Less than 2 years
- ◯ 2-3 years
- ◯ 4-6 years
- ◯ More than 6 years

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 10. List four dental specialties that you believe are most valuable to the Navy. Please rank in order (highest to lowest)**

1 (highest)

2

3

4 (lowest)

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 11. Prior Enlisted**

- ◯ Yes
- ◯ No

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 12. Marital Status**

- ◯ Single, never married
- ◯ Married
- ◯ Married to a military member
- ◯ Divorced, Separated, Widowed

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 13. Number of dependents (not including spouse)**

- ◯ 0
- ◯ 1
- ◯ 2
- ◯ 3
- ◯ 4
- ◯ 5 or more

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 14. Current Duty Assignment**

- ◯ Sea
- ◯ Shore
- ◯ Overseas
- ◯ Student
- ◯ Individual Augmentation
- ◯ Global Support Assignment

Naval Dental Corps Non-Monetary Incentives Retention Survey

* **15. In addition to your current assignment, are you assigned to a Platform (e.g. fleet hospital, Marine unit, etc.)?**

- ◯ Yes
- ◯ No

16. If you answered 'Yes' to the previous question, please indicate the platform type:

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 17. If given your choice of duty assignment, which one would be your first choice:**

- ◯ Sea
- ◯ Shore (CONUS)
- ◯ Shore (OCONUS)
- ◯ Operational assignment

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 18. Number of months deployed to a hostile area (Enter zero (0) if none)**

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 19. Which of the following annual bonus(es)/special pay(s) do you receive? Check all that apply.**

- [ ] Additional Special Pay (ASP)
- [ ] Variable Special Pay (VSP)
- [ ] Board Certified Pay (BCP)
- [ ] Incentive Special Pay (ISP)
- [ ] Critical Skills Retention Bonus (CSRB)
- [ ] Dental Officer Multi-Year Retention Bonus (DOMRB)

Naval Dental Corps Non-Monetary Incentives Retention Survey

The following questions attempt to determine the dollar value you would assign to various potential non-monetary incentives. First, you will be asked to estimate the baseline dollar amount ("bonus") you would require to induce you to extend on active duty for four additional years. Then, you will be asked how much (in dollars) of that bonus you would be willing to give up to receive various non-monetary incentives. These values are critical to establishing the cost-effectiveness of offering each benefit.

*** 20. What is the minimum amount of money (in dollars) you would require as a bonus payment (above and beyond your salary and other pays) to commit to four more years of active duty?**

- ◯ I would extend if no bonus were offered
- ◯ No amount of money would entice me to obligate more time
- ◯ To obligate for four years, I would require a minimum of $. Please specify the amount

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Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 21. Assuming the retention bonus you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following:**

- Homesteading for two consecutive tours only. Please specify the dollar amount
- Platform Type of your choice only. Please specify the dollar amount
- Full-time Postgraduate training only. Please specify the dollar amount
- Sabbatical only. Please specify the dollar amount

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 22. Assuming the retention bonus you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following combinations of incentives:**

- Homesteading for two consecutive tours and platform type of your choice. Please specify the dollar amount
- Homesteading for two consecutive tours and Postgraduate training. Please specify the dollar amount
- Homesteading for two consecutive tours and Sabbatical. Please specify the dollar amount
- Platform Type of your choice and Full-time Postgraduate training. Please specify the dollar amount
- Platform Type of your choice and Sabbatical. Please specify the dollar amount
- Full-time Postgraduate training and Sabbatical. Please specify the dollar amount

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 23. Assuming the bonus amount you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed the following combinations of incentives:**

- Homesteading for two consecutive tours, Platform Type of your choice, and Full-time Postgraduate training. Please specify the dollar amount
- Homesteading for two consecutive tours, Platform Type of your choice, and Sabbatical. Please specify the dollar amount
- Homesteading for two consecutive tours, Full-time Postgraduate training, and Sabbatical. Please specify the dollar amount
- Platform Type of your choice, Full-time Postgraduate training and Sabbatical. Please specify the dollar amount

Naval Dental Corps Non-Monetary Incentives Retention Survey

*** 24. Assuming the bonus amount you specified in #20 is available to you, how much of this bonus (in dollars) would you be willing to give up if you were guaranteed all four incentives:**

Homesteading for two consecutive tours, Platform Type of your choice, Full-time Postgraduate training, and Sabbatical. Please specify the dollar amount

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*** 25. List any other measurable characteristics (e.g. previous civilian experience) that increase a Dentist's value to the Navy.**

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Naval Dental Corps Non-Monetary Incentives Retention Survey

26. List any other non-monetary incentive(s) (e.g. compressed work week, promotion opportunity/timeline, and support staff) that the Navy could offer which would be attractive to you.

27. Please indicate the amount of the bonus (in dollars) you would be willing to give up, to receive the incentive(s) that you mentioned in question #26.

Naval Dental Corps Non-Monetary Incentives Retention Survey

EXIT

APPENDIX B

II. AUCTION THEORY

Presently the size or amounts of the Selected Reenlistment Bonuses are predetermined in "response to market forces as retention changes in ratings, NECs, and skills."[9] Specifically, planners at the Naval Bureau of Personnel determine which ratings and Navy Enlisted Classifications (NECs) qualify as undermanned, suffering from low retention or have high replacement costs. They then determine the level of cash bonus at which the Navy can expect "a reasonable prospect of enough improvement in retention in response to the award to justify the cost."[10] This determination is made primarily through use of the Annualized Cost of Leaving Model (ACOL). This model theorizes that individuals compare their projected Military earnings stream with their possible civilian earnings stream plus their taste for civilian life to determine whether to continue military service.[11] By using this model, planners derive the estimated minimum SRB amount that would induce the requisite number of Sailors to stay in the Navy.

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[9] Chief of Naval Operations (CNO), OPNAVINST 1160.8A, Department of the Navy, Office of the Chief of Naval Operations (Washington, D.C.: 2007).

[10] CNO, OPNAVINST 1160.8A.

[11] Michael L. Hansen and Jennie W. Wenger, "Is the Pay Responsiveness of Enlisted Personnel Decreasing?" *Defence and Peace Economics* 16, no.1 (2005): 33. Hansen and Wenger suggest including "basic pay, allowances for subsistence and housing, and retirement pay .... [and any] SRB for which the individual is eligible."

A. COST OF RETENTION MECHANISM CURRENTLY USED BY THE NAVY

By using a predetermined SRB amount as described above, the Navy planners are actually attempting to determine the marginal SRB required by the final (or most reluctant) Sailor that must reenlist to meet end-strength. Unfortunately, all previous (or more-willing) Sailors must also receive this amount under the current system, as shown in Figure 1.

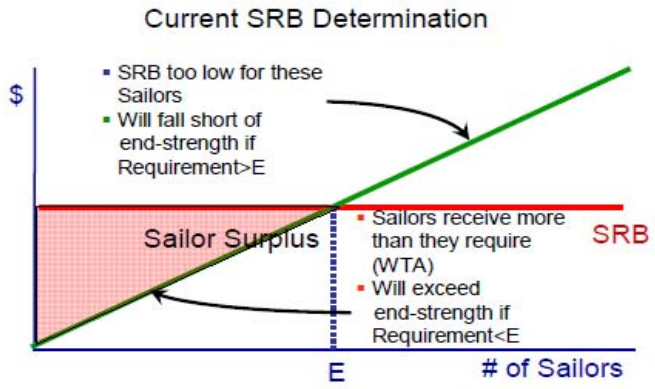

Figure 1. Cost of Existing SRB Determination

If planners underestimate the optimal SRB level, i.e., set the bonus too low, there will not be enough Sailors who are willing to retain, the Navy will not meet end-strength goals, and readiness will suffer. If planners overestimate the optimal SRB level, i.e., set the bonus too high, too many Sailors will be willing to retain and the Navy could overshoot end-strength. This would result in budget overages. Alternatively, if the bonus was set above the optimal SRB level, reenlistments could be suspended once end-strength was reached. This would be sub-optimal as

retention would be based on a first-come basis, heavily favoring those whose end of active obligated service (EAOS) falls in the first half of the fiscal year. This would not only be potentially unfair to those with later EAOS dates, but it would not retain those Sailors (regardless of EAOS date) who are most willing to remain in the Navy. This would potentially raise later retention costs.

The green line in Figure 2 represents the labor supply curve or Sailors' reservation costs to remain in the Navy. The blue line represents the optimal SRB. The two red lines illustrate the result of setting the SRB level too high or too low.

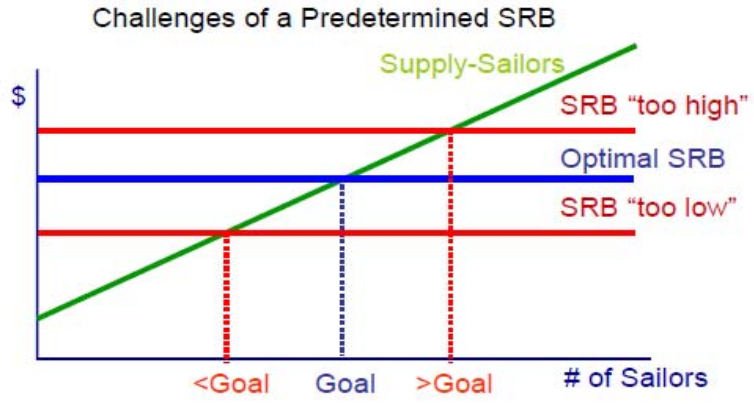

Figure 2. Predetermined SRB Challenges

This thesis will illustrate an auction mechanism that endogenously determines the precise (and minimum) SRB level necessary to induce the right number of reenlistments and overcome the flaws of the current system. Theoretically, a retention auction would not only set the market clearing SRB level that is appropriate for the current labor supply

and demand conditions, but would also identify which individual Sailors are to be retained.

B. AUCTION DESIGN

The Encarta Dictionary defines an auction as, "a sale of goods or property at which intending buyers bid against one another for individual items, each of which is sold to the bidder offering the highest price." This actually defines the most widely understood auction: a *forward auction*. There are numerous variations on this common type of auction, some of which will be discussed in the following sections.

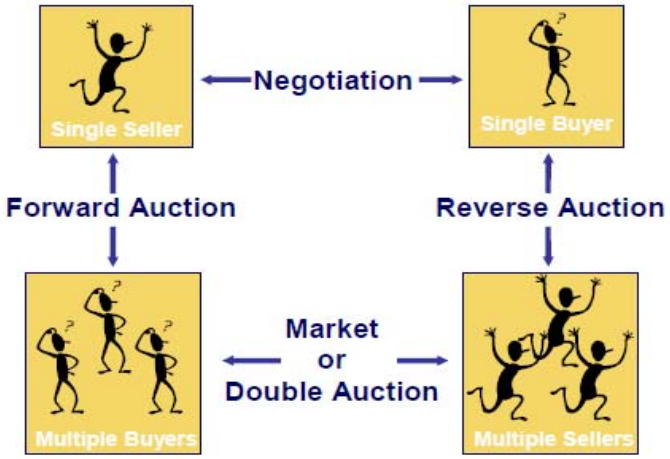

Figure 3. Auction Variations (*From* Coughlan, Introduction to Auction Economics)[12]

[12] Peter J. Coughlan, "Introduction to Auction Economics," (lecture, Naval Postgraduate School, Monterey, CA, November 29, 2004).

An auction is, more precisely, "an exchange mechanism"[13] that allocates resources to the winning bidder. Whether the winner is buying or selling, how many winners there are, and the price the winner pays or receives is determined by the auction variation.

1. Auction Variations

This section will discuss some of the most common auction variations, specifically those germane to this research. Additionally, an introduction to the combinatorial auction, which is less common, will be provided.

Figure 4. Common Auction Variations (*From* Coughlan, Introduction to Auction Economics)[14]

a. Single-Winner Forward and Reverse Auctions

In a forward single-winner auction, there is one seller and multiple buyers. The winner is the highest bidder. This is the most widely known type of auction. A

[13] Peter J. Coughlan, "Introduction to Auction Economics."

[14] Peter J. Coughlan, "Introduction to Auction Economics."

reverse single-winner auction is characterized by multiple sellers and one buyer. An example of this is the competition for government contracts. The winner is the *lowest* bidder.

For simplicity, the following auction types will be described using a forward single-winner auction -- unless otherwise noted.

b. Open-Bid vs. Sealed-Bid Auctions

Open-bid auctions are those in which bidders openly declare their bid amounts or intentions. Open bid auctions can be ascending (English auction). The bidding starts at a minimum price and the auctioneer increases the bid incrementally until there are no more takers. They can also be descending (Dutch auctions). The auctioneer starts at a predetermined price (high enough so that no bidder is interested) and decreases incrementally until a bidder accepts that price.

Sealed bid auctions are those in which bid amounts are submitted (often in a roughly simultaneous fashion) without any disclosure until after the winner is determined. Sealed bid auctions come in two common variations. In a first-price auction, the winner is the highest bidder and he pays the amount he bid. In a second-price (Vickrey) auction, the winner is still the highest bidder. The price he pays, however, is the bid of the next highest bidder.

c. Reverse Second-Price Sealed-Bid Auction

Given the retention context, this thesis will be focusing on reverse auctions. In a reverse auction there

is only one buyer (for example, the Navy) and many sellers (the Sailors offering their services) who are also the bidders.

While the results of this thesis generalize to other reverse auction formats, the focus will be on reverse second-price sealed-bid auctions. In a reverse second-price auction, the lowest bidder provides the goods or services (in this case, military labor), but *at the price of the first excluded (next highest) bidder.*

There will be further discussion of the specific auction formats analyzed in Chapter IV.

d. Bidding Strategy: Second-Price Auction

Under a second-price auction, the optimal bidding strategy is to bid one's true valuation. For example, if an individual is bidding for an item which is worth $30 to him (he would be willing to pay a maximum of $30 for the item), then his best strategy is to bid exactly $30 for the item in a second-price auction.

To understand this result more clearly, this section will illustrate how one can never do better than bidding truthfully in a second-price auction. For simplicity, the explanation that follows employs the following notation:

V = Your value for the object

P = Price paid for the object

S = Your surplus

B = Your bid for the object

H = Highest bid submitted by any other bidder

The following section will first demonstrate that bidding *above* your true value (i.e., choosing B > V) can only hurt you. It will then demonstrate that bidding *below* your true value (i.e., choosing B < V) can only hurt you. Figure 5 illustrates the three possible cases or outcomes which can result from bidding above your true value. Figure 6 illustrates the three possible cases or outcomes which can result from bidding below your true value.

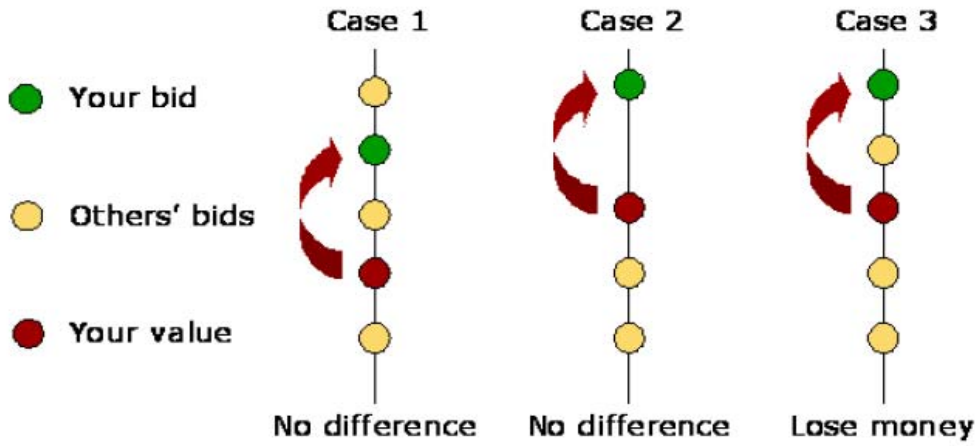

Figure 5. Bidding Above Your Valuation (*From* Coughlan, Introduction to Auction Economics)[15]

For all cases, the reader should note that your objective as a bidder is to maximize your surplus, S. If you do not submit the highest bid (i.e., if B < H), then S = 0. If you do submit the highest bid (i.e., if B > H), then P = H and your surplus is given by S = V − P = V − H.

[15] Peter J. Coughlan, "Introduction to Auction Economics."

Case A1: H > B > V

In this case, because H > B, you are not the high bidder and you do not win the object; therefore S = 0. If you bid truthfully (B = V), you also do not win the object (because H > V) and, therefore, would also have S = 0. Thus, bidding above your true value provides no benefit in this case.

Case A2: B > V > H

In this case, because B > H, you are the high bidder and win the object; therefore S = V − H > 0. If you bid truthfully (B = V), you also win the object (because V > H) and, therefore, would also have S = V − H. Thus, bidding above your true value provides no benefit in this case, either.

Case A3: B > H > V

In this case, because B > H, you are the high bidder and win the object; therefore S = V − H, which is *negative,* because H > V: you "win" the object, but pay more than it is worth to you. If you bid truthfully (B = V), on the other hand, you would not win the object (because H > V) and, therefore, would have S = 0. Thus, bidding above your true value hurts you in this case. You would be better off bidding truthfully.

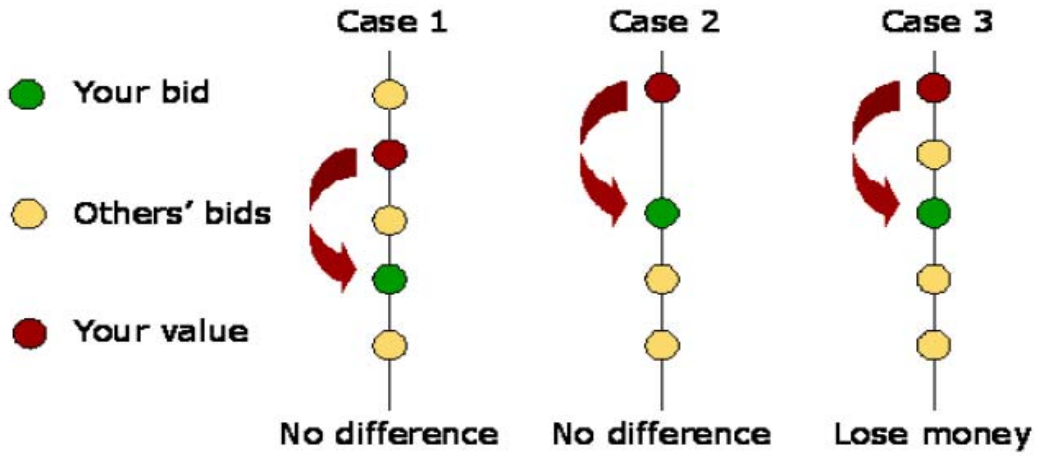

Figure 6. Bidding Below Your Valuation(*From* Coughlan, Introduction to Auction Economics)[16]

Case B1: H > V > B

In this case, because H > B, you are not the high bidder and do not win the object; therefore S = 0. If you bid truthfully (B = V), you also do not win the object (because H > V) and, therefore, would also have S = 0. Bidding below your true value provides no benefit in this case.

Case B2: V > B > H

In this case, because B > H, you are the high bidder and win the object; therefore S = V − H > 0. If you bid truthfully (B = V), you also win the object (because V > H) and, therefore, would also have S = V − H. Thus, bidding below your true value provides no benefit in this case.

[16] Peter J. Coughlan, "Introduction to Auction Economics."

Case B3: V > H > B

In this case, because H > B, you are not the high bidder and do not win the object; therefore S = 0. If you bid truthfully (B = V), you would win the object (because V > H) and, therefore, would have S = V − H. This is positive because V > H. Thus, bidding below your true value hurts you in this case. You would be better off bidding truthfully.

This demonstrates that bidding anything other than your true value in a second-price auction can only hurt you. Under this auction format, truthful revelation (B = V) is the optimal bidding strategy.

e. Bidding Strategy: First-Price Auction

Under a first-price auction, it is immediately apparent that truthful revelation (B = V) is NOT the optimal bidding strategy. If you are the high bidder (i.e., if B > H) under a first-price auction, you will win the object but the price you pay will be the amount you bid (i.e., P = B). Therefore, you will earn no surplus (S = V − P = V − B = V − V = 0). Instead, the optimal strategy is to bid some amount below your true value (i.e., to bid B < V).

By how much should you "underbid" your true value in a first-price auction? To answer this question, consider that if all bidders underbid their true values by the same fraction or amount (or, more generally, according to the same underbidding or discounting rule), the winning bidder will always be the bidder with the highest value for the object.

Because S = V − P = V − B only if you win the object and S = 0 otherwise, the amount you bid only matters if you win the object. This means that you might as well bid as if you are the winning bidder, i.e., the bidder with the highest value for the object.

Identifying the optimal bidding strategy in a first-price auction boils down to answering the following question: if you have the highest value for the object among all bidders, how low can you bid and still win the object? The answer is that you can bid as low as the second highest bid, which you can safely assume will be at or below the second highest value for the object. Thus, the optimal bidding strategy (technically, the "equilibrium" bidding strategy) in a first-price auction is to bid what you expect the next highest value would be if your value for the object was the highest value among all bidders.

f. Revenue Equivalence

One interesting and important implication of the above-described optimal bidding strategies is that, on average, the seller of the object can expect to receive the same revenue -- whether the object is sold via first-price or second-price auction.

To see this, note that the price (or revenue) in a second-price auction will be equal to the second-highest bid. Because the optimal bidding strategy is to bid truthfully, this will be equal to the second-highest value. Under a first-price auction, the price (or revenue) will be equal to the absolute highest bid. In equilibrium, the

high bidder in a first-price auction will bid what he expects to be the second-highest value.

Thus, under either auction format, the expected price is equal to the expected second-highest valuation. Thus, in general, the expected revenue for the seller under either auction format is the same.

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